PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHE

MARCH, 1957

NEWPORT

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EPON® RESIN does it!

Tough primer on RCA WHIRLPOOL Washers

withstands rugged washday punishment

RCA WHIRLPOOL Washer cabinets on storage conveyors. Finish system includes an Epon resin undercoat, formulated by Grand Rapids Varnish Corporation.

Epon resin-based finish plus careful inspection eliminate customer complaints.

HERE'S HOW...

SOAPS AND MODERN high-strength detergents are persistent enemies of ordinary paint. Because of severe corrosive conditions in some geographical areas, home laundry appliances often show rust stains in just a few weeks of service.

Whirlpool-Seeger Corporation, St. Joseph, Michigan, has found that a primer based on Epon resin gives an outstandingly superior protective finish to its washers, driers, and other home laundry equipment. To maintain the highest standards for coatings, Whirlpool-Seeger set up a system of continuous quality-control testing in their finishing section.

Epon resin-based primers, now standard on RCA WHIRLPOOL Washers, are credited with all but eliminating a major source of field complaints about coating failures.

Paint users in many industries are recognizing the basic advantages of Epon resin-based formulations—excellent adhesion, high resistance to impact and abrasion, outstanding resistance to moisture, heat and corrosives.

Your Shell Chemical representative will explain how Epon resins can improve your own paint and enamel formulations. Write or phone for the brochures: *"Epon Resin for Surface Coatings"* and *"Epon Resin Esters for Surface Coatings."*

Epon resins are the epoxy polymers made exclusively by Shell Chemical Corp.

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This product permits you to manufacture enamels with *high solids* for maximum fill and depth with the smallest number of spray coats. At the same time, with SUPER-BECKAMINE 3555-60 your enamels will be *considerably harder than average when cured.* Despite the increased hardness, *they will also have gloss equal to or higher than that of enamels formulated with other melamine resins available today.* They will not be brittle either!

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PAINT and VARNISH Production

(REG. U.S. PATENT OFFICE)

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOL. 47 MARCH, 1957 NO. 4

NEXT ISSUE

Cold-hardening of Epoxy Resins with Amino Compounds is scheduled for the April issue. Since epoxy resin based finishes are being used in increasing amounts, there has been considerable interest in the possibility of curing these finishes at room temperature. Such finishes have been marketed, and by and large, amino compounds were used as the hardening agent in such preparations. The article is concerned with a study of the cold hardening system based on epoxy-amine combinations.

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Published Monthly by
Powell Magazines, Inc.
Executive and Editorial Offices
855 Ave. of Americas
New York 1, N. Y.
BRyant 9-0499

JOHN POWELL, *Publisher*

ANTHONY ERRICO, *Editor*

A. L. BENDER
Production Manager

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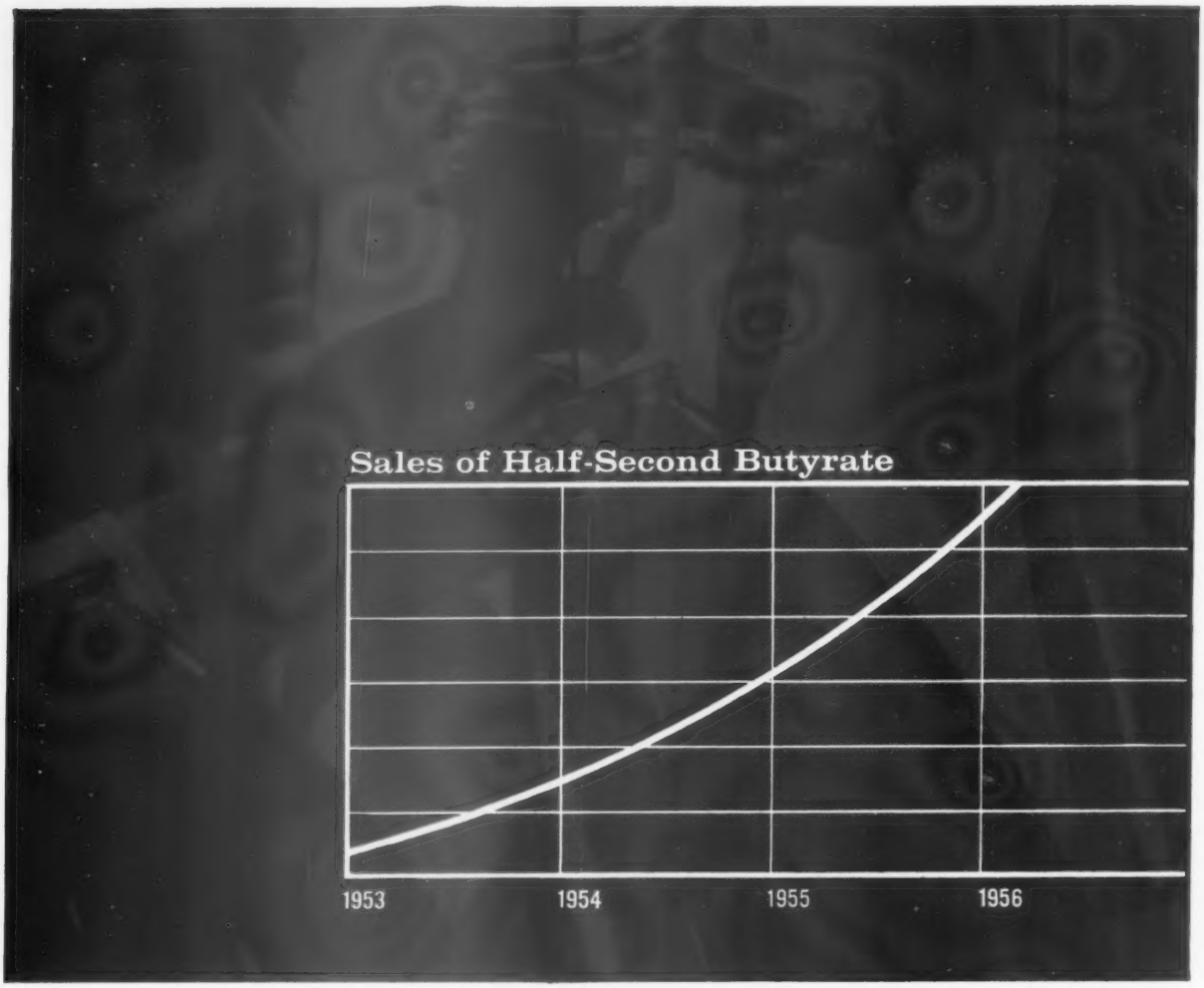
855 Ave. of Americas
New York 1, N.Y.
BRyant 9-0499

DUNCAN P. MACPHERSON
700 S. Washington Sq.
Philadelphia, Pa.
LOmbard 3-9982

Advertising Representatives
McDONALD-THOMPSON
West Coast Representatives

MEMBER BUSINESS BPA PUBLICATIONS AUDIT, INC.

PAINT and VARNISH PRODUCTION is published monthly except semi-monthly in February at Easton, Pa. by Powell Magazines, Inc. John Powell, president; Ira P. MacNair, vice-president and treasurer; Alice L. Lynch, secretary. Entered as second class matter at Post Office at Easton, Pa., Jan. 30th, 1952, under the Act of March 3, 1879. Subscription rates: United States and Possessions, $3.00 a year, $5.00 for two years, $10.00 for five years. Single copies 50c each. Canada, $4.00 a year. Pan American Countries, $4.00 a year. All other countries $8.00. Editorial and business office: 855 Avenue of the Americas, New York 1, N. Y. BR-9-0499.



Use of Half-Second Butyrate is growing

Investigate this versatile film former

Since its introduction in 1953, the use of Half-Second Butyrate has been growing at a steadily accelerating pace.

First used to produce clear, durable lacquers for the protection of outdoor aluminum surfaces, Half-Second Butyrate is now being employed in a rapidly expanding number of important applications. In wood lacquers, for instance, it provides non-yellowing protection for light wood surfaces. In paper lacquers, it makes possible high-gloss films that resist scuffing, blocking and darkening. In bronzing lacquers, it means a non-gelling vehicle that does not react with metallic pigments.

Safely shipped and easily handled as a dry powder, Half-Second Butyrate produces films of low color and high clarity with excellent strength and flexibility at high and low temperatures. It can be formulated with readily available, low-cost solvents. Extremely stable to ultra-violet light, Half-Second Butyrate films retain their initially low color, high strength and flexibility for long periods. No other easily-sprayable, air-drying film former exhibits this combination of characteristics to such a high degree. In addition, Half-Second Butyrate films possess excellent abrasion resistance and are little affected by prolonged water immersion.

If you need a protective coating to decorate metal, wood, glass, plastic, paper or foil, consider the advantages and versatility of Eastman Half-Second Butyrate. Write for samples and information.

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Editorial Comment

March, 1957

Show Off Your Plant

ONCE each year, the Chemical Industry sets aside a week in which to tell America what it has accomplished for this nation and the people in it, and what it can achieve in the future. It is known as Chemical Progress Week.

This year that week will be April 8-12. As for the last three years, a great deal of the success of this occasion will depend how well those within the industry itself can publicize the part they contribute to the growth of the chemical field.

One way of accomplishing this task lies in throwing open your doors to the citizens of your community, or perhaps only to specific groups during this week.

By arranging tours in your plant you are helping the ordinary citizen to have a better understanding of you, your products, your company, and the paint industry which is an important segment of the chemical industry. In addition, the average citizen can see for himself the relations between research, production and the uses of capital. Since paint is an ordinary commodity familiar to everyone, the average citizen does not have an appreciation of the part that the science of chemistry is playing in paint production methods, raw materials, and in the final paint product itself. This is a golden opportunity to show him, in a dramatic way, that today's paint products are backed up with specialized technical "know-how" just as drugs, plastics, synthetic fibers, etc. Of equal importance is that you can point out the excellence of your product by emphasizing such things as modern equipment for the manufacture of paint, and inspection and testing to assure quality control.

Another purpose of such plant tours is to acquaint science students to better understand the field of paint technology.

To arrange such plant tours requires considerable planning. This can best be handled through committees who should consider guest arrangements, publicity, inspection tours, plant clean-up and safety, exhibits, and refreshments. Most local Chambers of Commerce have a department designed to help you organize such an undertaking.

One of the most effective ways of publicizing your plant tour is through various civic, professional and business groups of your community, Women's clubs, high school faculty, classes and organizations. Of course the press and radio can be used to advantage also if you are planning an "open house" affair rather than special group visits.

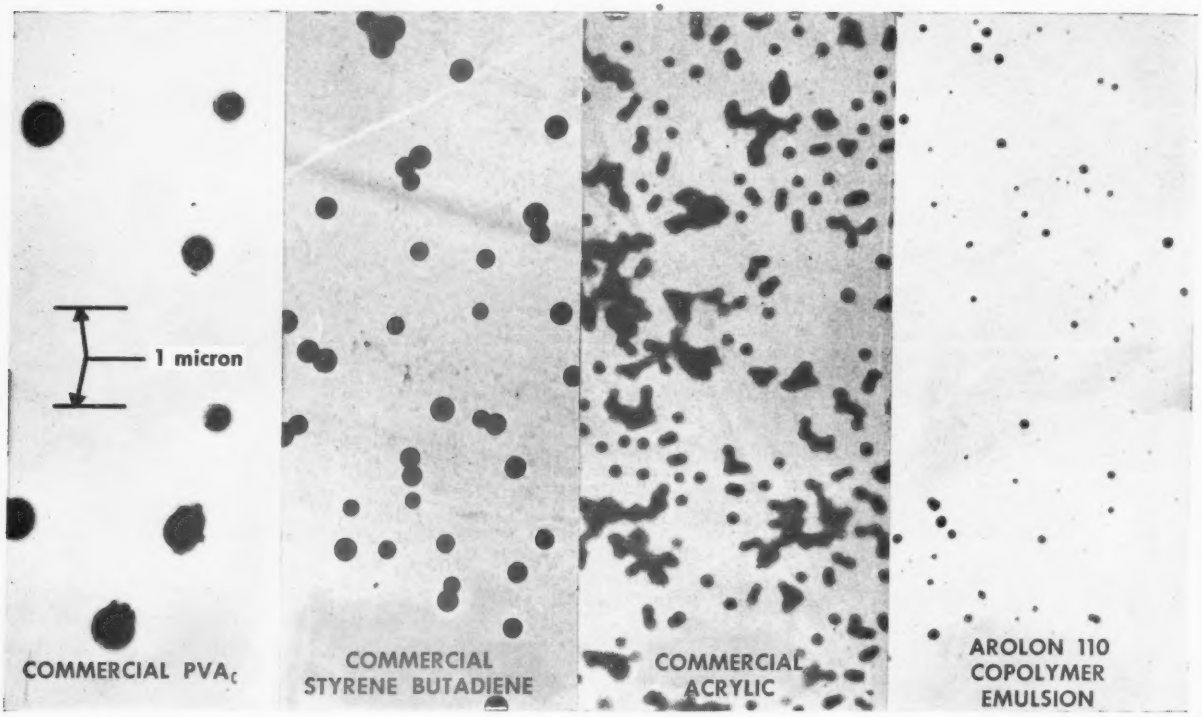
All plant tours should be made interesting as possible, but keep it simple, emphasizing the high spots of your operation. The tour should run not more than one hour.

Make sure your plant is spic-and-span so your visitors will be impressed. Also, every effort should be made to insure the safety of your visitors. Danger spots should be avoided on the tour or roped off.

Plan to distribute literature on the history and the products of your firm at the end of the tour.

On the occasion of Chemical Progress Week you as an industrial member of your community can gain much goodwill. The fact that you have been considerate enough to invite your neighboring citizens to visit your plant can only increase goodwill. Why not open the doors of your plant to the public during April 8-12th.

New concept in water emulsion vehicles



Smaller Particle Size of Arolon 110 Creates Exceptional Film Continuity, Pigment Binding Power

The electron microscope proves that unique Arolon 110 has the smallest particle size of all commercial emulsions. And paints based on Arolon 110 show the result—greater film continuity, greater pigment binding power, high gloss.

Photo above shows four commercial emulsions magnified 4,000 times. Arolon 110 particles are at the right.

Arolon 110 can be used to make a complete water-thinned trade sales line—flats, primer-sealers, and semi-gloss. These are just a few of the benefits never before possible until ADM research successfully reacted synthetic and oil based monomers by emulsion polymerization.

Other advantages: Washes quickly from brushes and rollers with water from the faucet . . . minimum odor . . . outstanding pH stability for long shelf life . . . absence of settling . . . recoating permissible within an hour.

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SPECIFICATIONS

Percent solids	46±1%
Solvent	Water
Viscosity (Brookfield) (Spindle #3 at 60 r.p.m.)	400—1,000 cps.
pH	8—9 Approx.
Weight per gallon	8.5—8.6 lbs.
Specific gravity (solids)	1.023—1.035
Settling	None

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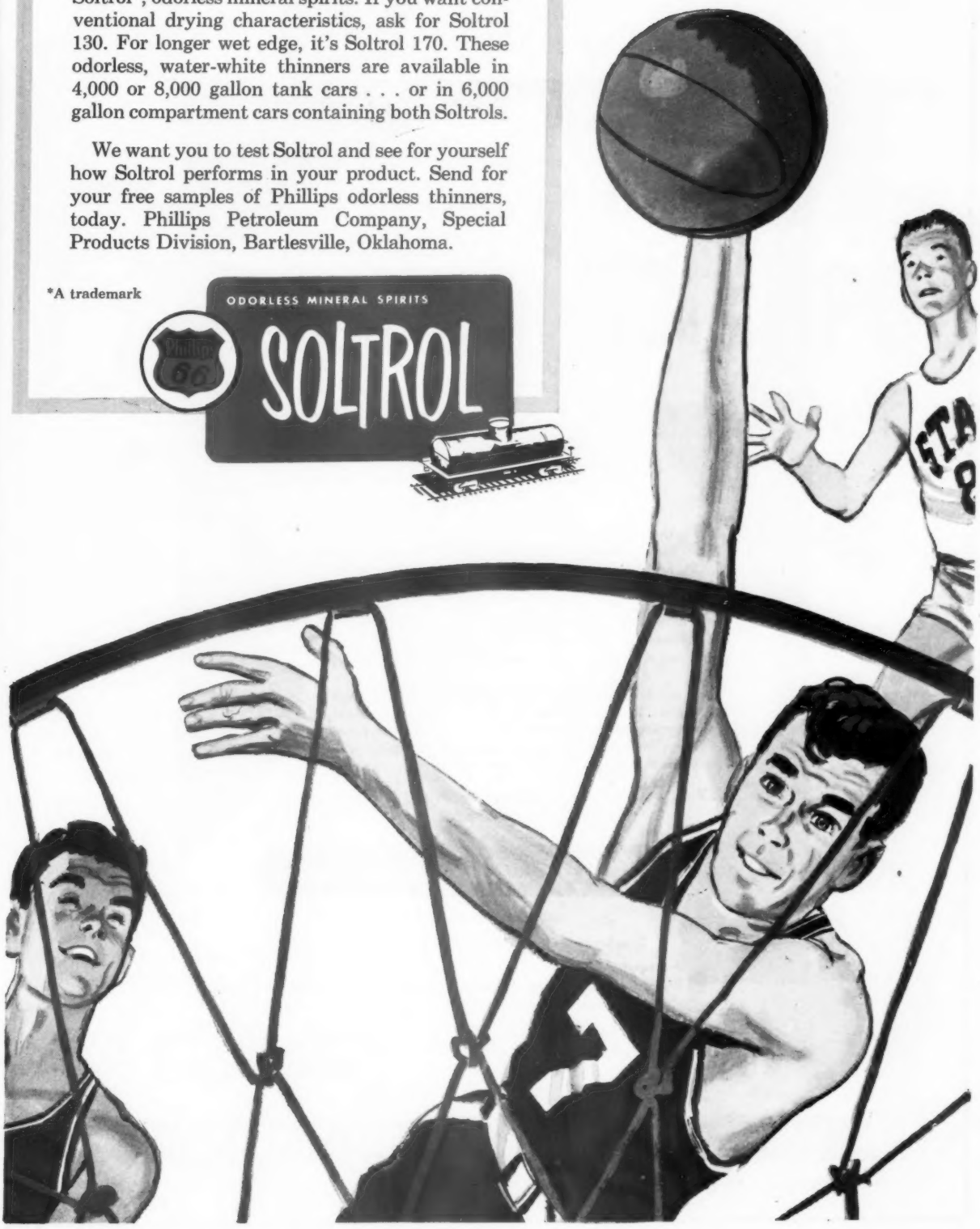

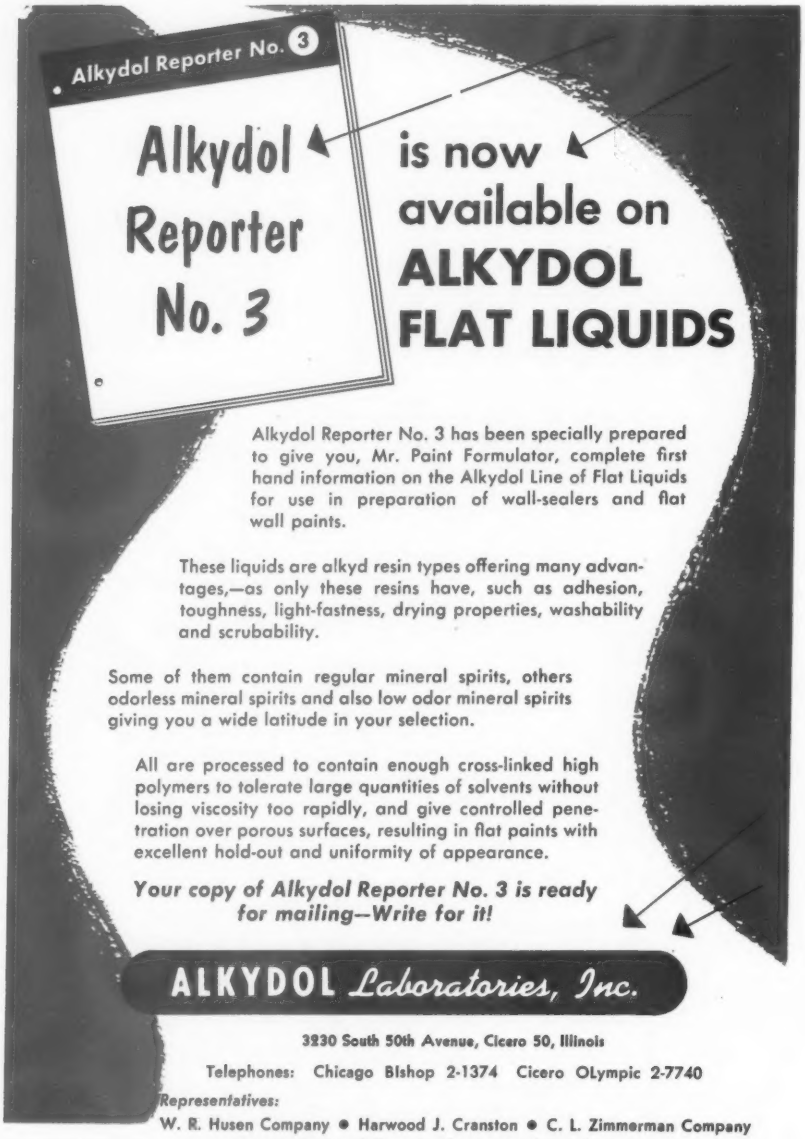
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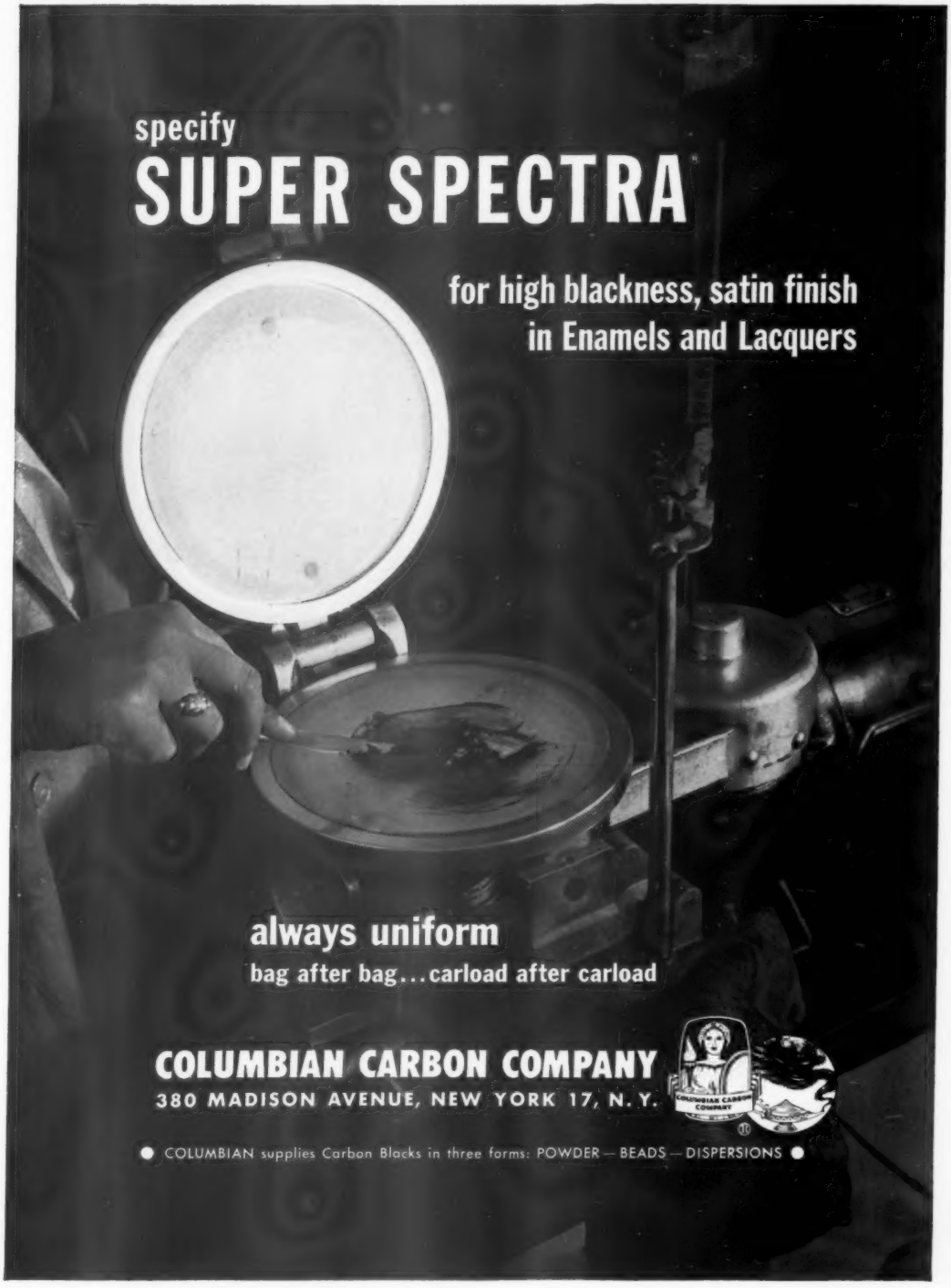
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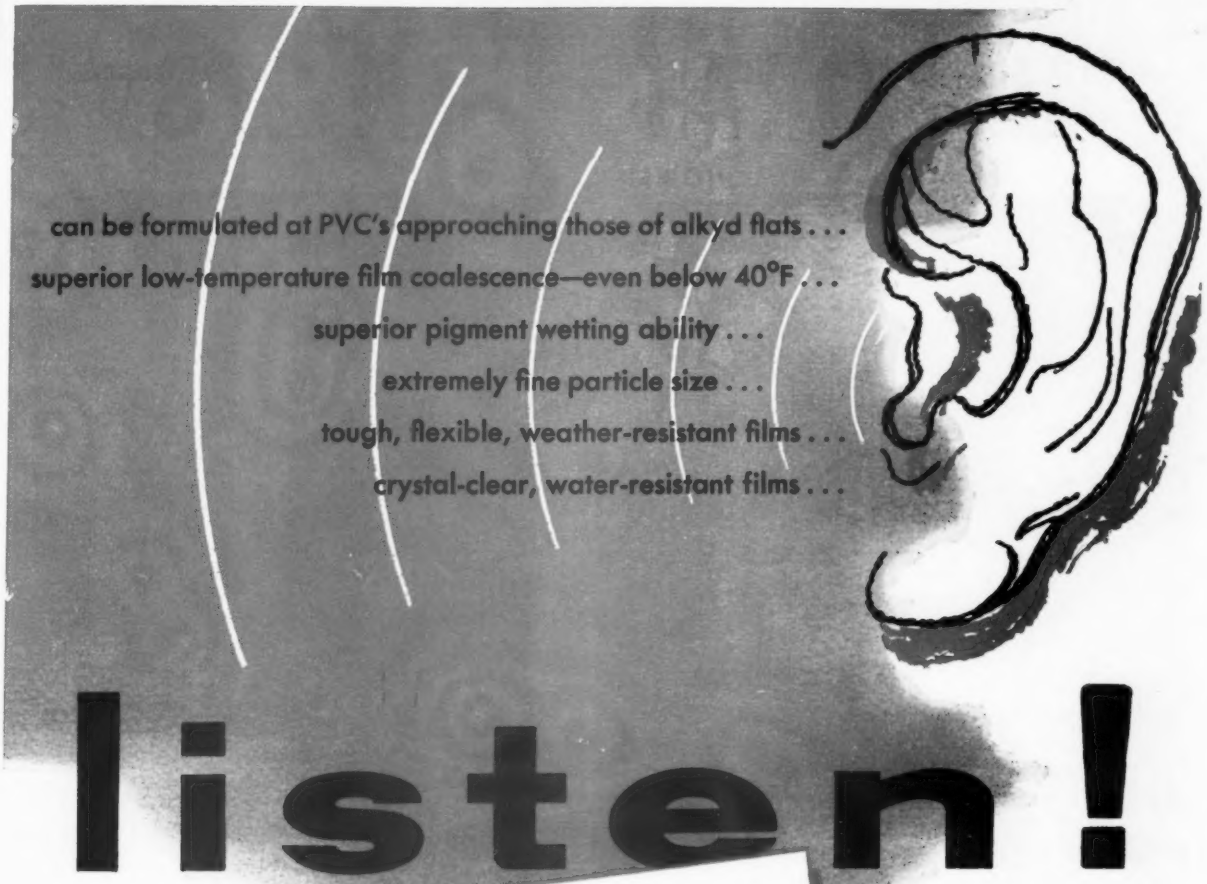
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*Celanese **HQ*** not only stands for Highest Quality, but also for HeadQuarters for PVAc requirements. Celanese®

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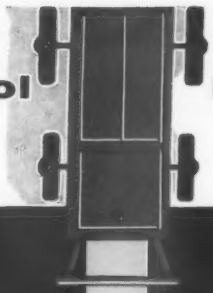

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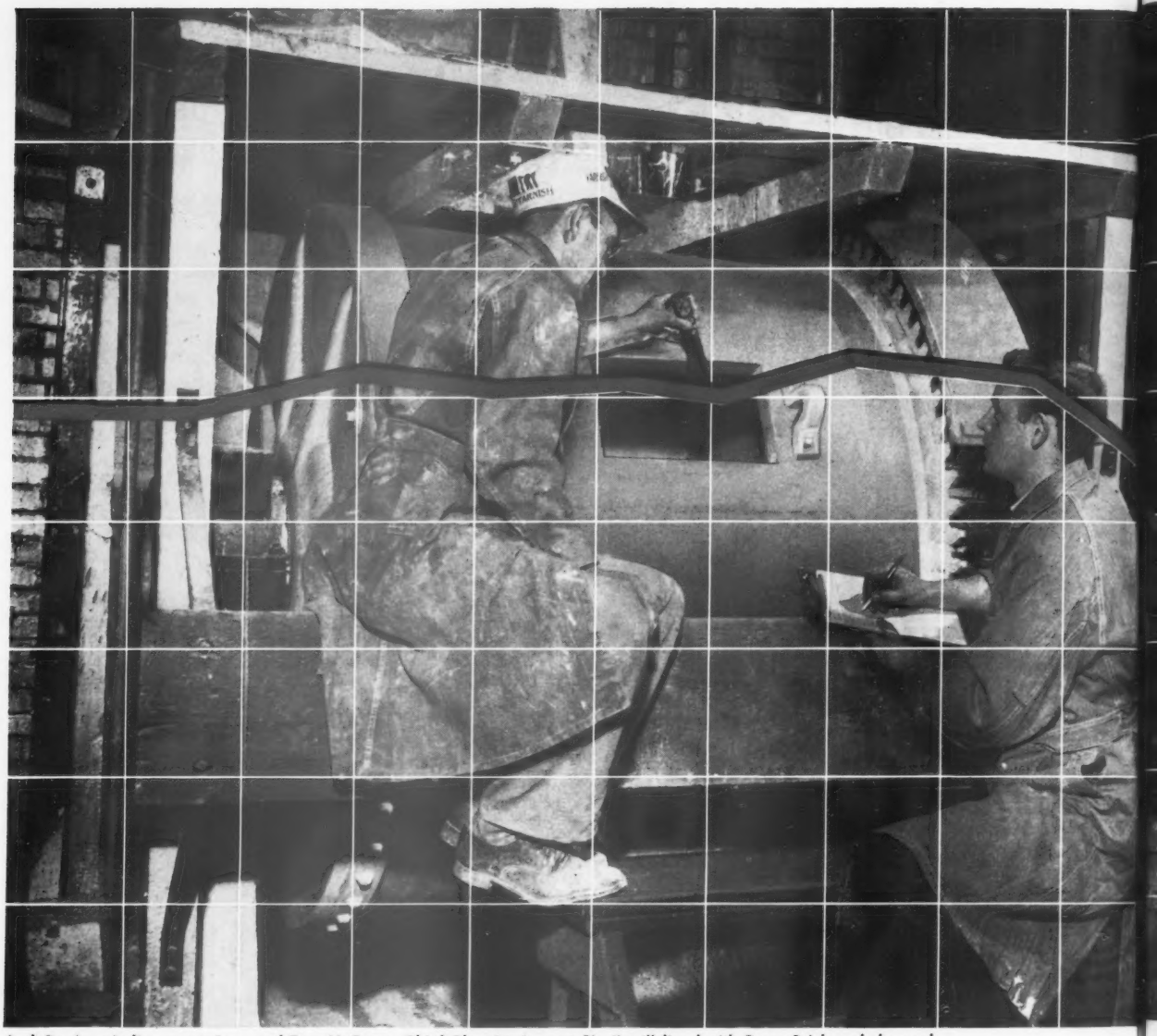

Jack Davis, grinding supervisor, and Tom McCurry, Chief Chemist, inspect 5'x 4' mill lined with Coors Brick and charged with Coors Grinding Media at McMurtry Mfg. Co., Denver

"Grinding time has been reduced 40% to 50% on products ground in our 5' x 4' Mill since we relined it in December, 1954, with a COORS High Density Lifter Bar Lining and charged it with COORS Grinding Media. Results from the 5' x 4' Mill were so good that in January, 1956, we relined and charged two 36" x 48" Mills in the same manner . . . and obtained similar results.

"This 40% to 50% reduction in mill time applies on our primers, house paints, flat varnish bases, lacquers and traffic paints. On enamels the time saving was even greater. For example, on "four-hour enamel" we get our grind in only 18 hours — less than half the time formerly needed . . . and we have obtained a 7-NS grind in only 12 hours.

"All grinding in the COORS equipped mills is done using a paste consistency of 110 KU *at milling* temperature." Jack Davis, Grinding Supervisor, McMurtry Mfg. Co.

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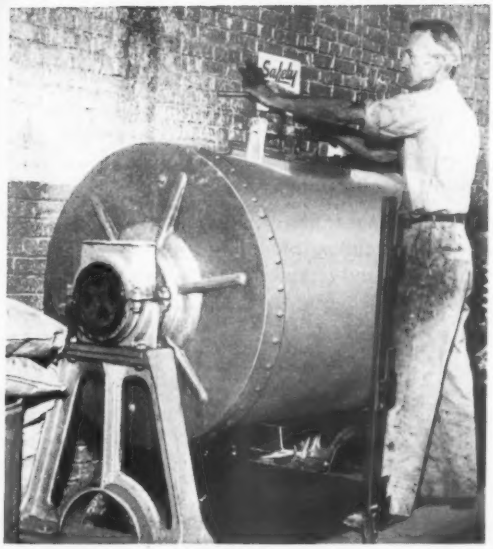
Coors HIGH DENSITY GRINDING MEDIA AND MILL LINER BRICK...PULL

mill time down 40% to 50%

AT McMURTRY MFG. CO., DENVER!



Ed Borowski tightens door clamp on one of the 36" x 48" COORS equipped mills at McMurtry's.

LZP Industrial Ceramics Co.
275 Kalamath St.
Denver 23, Colorado

Please send technical information and samples of Coors Grinding Media.

Name.....

Title.....

Company.....

Address.....

City.....State.....

Manufacturers of High Density Grinding Media and Mill Liner Brick

CSC NITROPARAFFINS

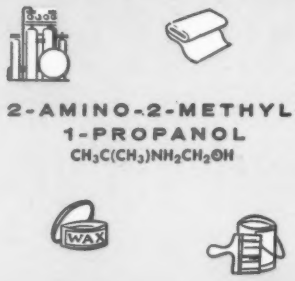
NITROMETHANE
CH_3NO_2

NITROETHANE
$CH_3CH_2NO_2$

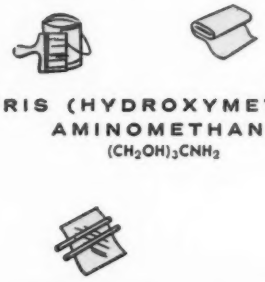
1-NITROPROPANE
$CH_3CH_2CH_2NO_2$

IMPROVING PROCESSES AND PRODUCTS

2-NITROPROPANE
$CH_3CHNO_2CH_3$



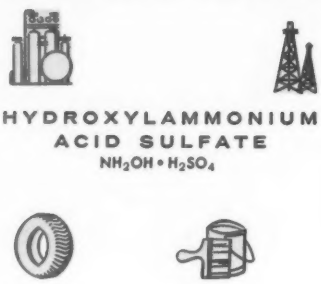
2-AMINO-2-METHYL-1-PROPANOL
$CH_3C(CH_3)NH_2CH_2OH$



TRIS (HYDROXYMETHYL) AMINOMETHANE
$(CH_2OH)_3CNH_2$

FOR AMERICA'S MAJOR INDUSTRIES

2-AMINO-2-METHYL-1, 3-PROPANEDIOL
$CH_2OHC(CH_3)NH_2CH_2OH$



HYDROXYLAMMONIUM ACID SULFATE
$NH_2OH \cdot H_2SO_4$

ALKATERGES

Nitroparaffins and their derivatives are economical, effective, versatile chemicals for such uses as solvents . . . prime ingredients . . . raw materials . . . sensitizers . . . emulsifiers . . . analytical reagents . . . reducing agents . . . inhibitors . . . short-stoppers . . . surface activants . . . dispersants . . . anti-foamants.

In a relatively short time, the members of the nitroparaffin family found wide use in many important industries.

New groups of derivatives are being studied continually for new and profitable applications. Steadily increasing quantities of these unusual chemicals are being shipped from CSC's plant in Sterlington, La.

Our Market Development team is ready to work with you in applying these outstanding products to your processes and products. Samples and technical data sheets are available on request.

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CSC
INDUSTRIAL CHEMICALS

"They're all re-ordering RO-11-S . . . says Mr. fatty acid

You can always follow the market with the broad line of ADM VEGETABLE FATTY ACIDS

	Iodine Value	Titer	Color (Gardner)	Acid Value
LINSEED				
Water White Distilled	180 Min.	17-20	3-Max.	197-204
Regular Distilled	157 Min.	18-24	6 Max.	197-204
SM-500	152 Min.	18-24	10 Max.	195-204
SOYA				
Water White Distilled	135 Min.	20-23	2 Max.	195-205
RO-10	124 Min.	23-29	5-6 Max.	195-205
RO-11-S	124 Min.	23-29	4 Max.	195-205
SOYA-TYPE				
RO-8	115 Min.	30 Max.	6-8	195-205
COTTONSEED				
Double Distilled	95-110	32-38	8 Max.	195-205
CORN				
Double Distilled	105-120	26-32	8 Max.	195-205

● The wires are hot, right now, with orders for ADM's RO-11-S Soya Fatty Acids. And most of the shipments are going to alkyd manufacturers who have used RO-11-S in the past.

Why are they re-ordering? Because RO-11-S enables them to produce top quality fatty acid alkyds *at a cost that assures a good profit.*

But price alone is not the only reason for such popularity. RO-11-S is a high quality, uniform product. One outstanding characteristic of RO-11-S is its excellent color stability . . . both in storage and in cooking. In addition, it is famous for fast drying, hardness, and non-yellowing.

The chart at right shows RO-11-S in relation to the whole broad line of ADM vegetable fatty acids. Study the chart . . . study your own needs for the months ahead . . . and we feel sure you will want to include some RO-11-S in an early order!

Take the Scientific Shortcut with

ADM fatty ACIDS

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● Please send information on the use of RO-11-S in the making of alkyds.

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*Company*_____

*Address*_____

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Soluble High Styrene Paint Resins

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MARBON "9200" HV

for low vehicle solids at higher viscosity

MARBON "9200" MV & LV

for general use

MARBON "9200" LLV

for high vehicle solids at lower viscosity

GET THE FACTS — *Write* TODAY FOR TECHNICAL LITERATURE

Marbon ®

MARBON CHEMICAL

Division of BORG-WARNER

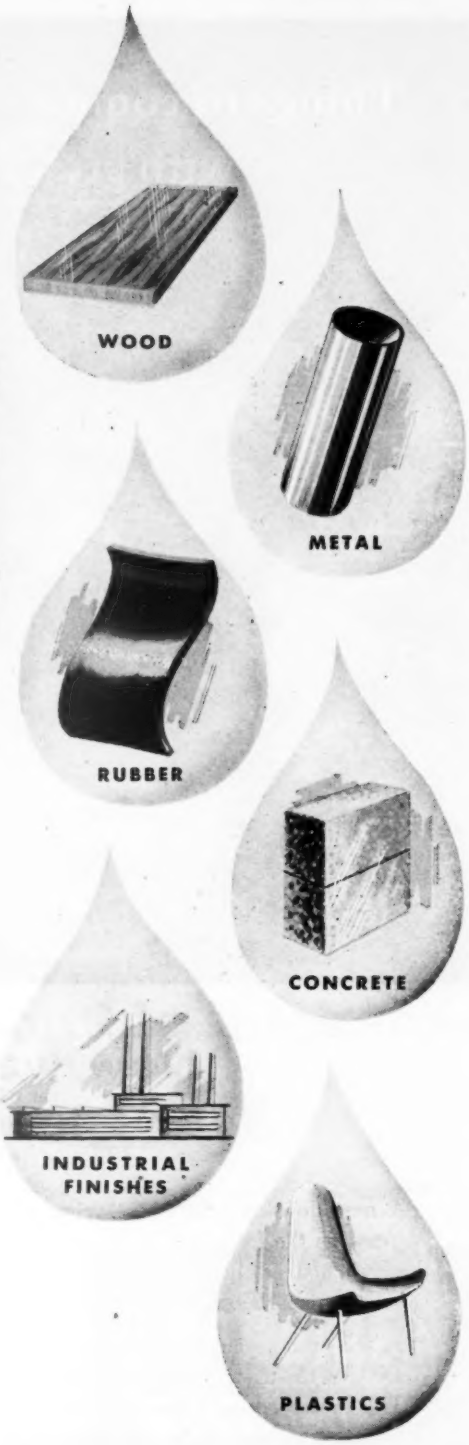
GARY, INDIANA

MARBON . . . *Your Buy-Word for Product Perfection*

Now ready for commercial use!

URETHANES

. . . the newest, toughest, most versatile coatings known!



They're out of the laboratory and ready for production . . . remarkable new urethane coatings that out-perform others in a wide range of applications. Urethane coatings are made from National Aniline's Nacconates*.

With a quick cure at relatively low temperature, urethane coatings give heretofore unapproachable resistance to abrasion, corrosion, chemical fumes, heat, salt-spray, weathering, grease and oils. And because of long wear, ease of application and modest first-cost, urethane coatings are economical.

Outstanding for use on metals, rubber, concrete and leather, formulations can be adjusted to produce gloss, semi-gloss or satin finishes. They can have excellent flexibility or form as hard a coating as you want.

Excellent dielectric properties and moisture resistance make urethanes suitable for wire coatings, particularly in motors and transformers. They save production time because no stripping is required for soldering.

We are prepared now to render valuable technical assistance in adapting urethanes to your coating needs. Your inquiry will bring prompt response.

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URETHANE COATINGS
based on
NATIONAL NACCONATES

New way to get heavier, faster-linking vinyl polymers

A new development* employing Glycerine to speed up the formation of high-molecular-weight vinyl polymers holds out the promise of plastics with new and unusual properties.

The process makes use of Glycerine's ability to increase the true, or *local*, viscosity of the solvent. This increased local viscosity acts to suppress the termination step of the polymerization reaction. Of all the thickening agents tested, only Glycerine had this effect.

The reaction brought about with this new process is claimed to yield polymers with molecular weights far in excess of those obtained by conventional methods. Work is under way to develop commercial possibilities of these new polymers.

*Developed by Dr. G. Oster, Polytechnic Institute of Brooklyn

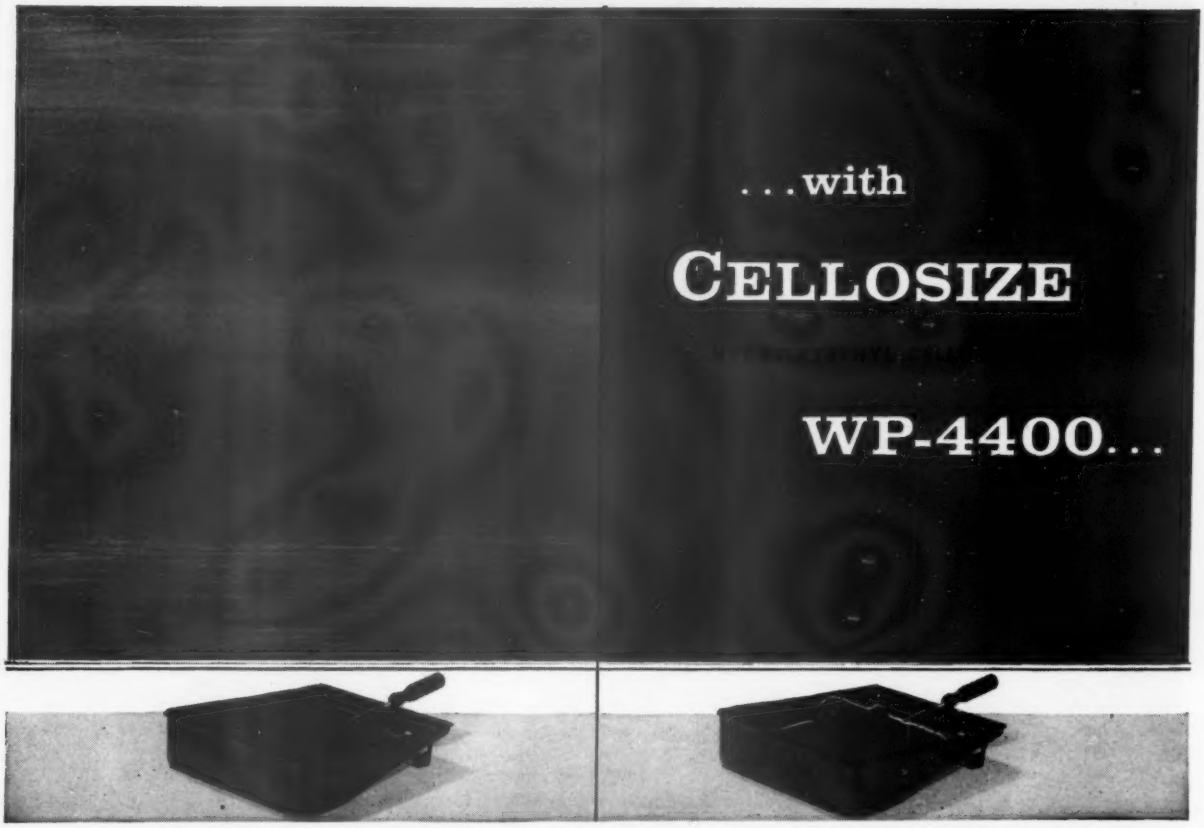
Glycerine's usefulness continues to grow. Stable in price, dependable in supply, Glycerine offers processors a unique balance of properties: It is hygroscopic, nontoxic, stable, nonvolatile, with excellent solvent power and agreeable taste. New applications for Glycerine are extending its use in paints, foods, pharmaceuticals, packaging and many other fields. For a handy 20-page booklet, "Glycerine Properties and Uses," write to:

Glycerine Producers' Association

295 Madison Avenue, New York 17, N. Y.

Nothing takes the place of Glycerine

What a difference in latex paints . . .



Nonionic CELLOSIZE WP-4400 gives clean, bright colors with minimum sheen variation.

a new, nonionic, water soluble thickener

Your search for an excellent, nonionic, water soluble thickener for latex paints is over. The answer: CELLOSIZE Hydroxyethyl Cellulose WP-4400, a free-flowing, white powder. Its viscosity in 2% aqueous solution—3500-5000 cps. Look at the added advantages you get with this excellent thickener—

In Production

- *Goes into solution readily at room temperature—this saves you time and money*
- *Stability in presence of dissolved salts is outstanding*
- *Reduces foaming in mixing kettle*
- *Contributes to mechanical, freeze-thaw and viscosity stability*
- *Won't gel at elevated temperatures*

In Application

- *Contributes to better scrub resistance and washability*
- *Improves brushing, leveling, and flow-out*
- *Gives excellent color values, especially with popular deep decorator colors*
- *Reduces sheen variation*
- *Reduces pinholing*
- *Helps improve hiding power*

Now is the time to get your samples and technical data. Write to Carbide and Carbon Chemicals Company, Room 328, Dept. H, 30 E. 42nd Street, New York 17, New York.

In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

The term "Cellosize" is a registered trade mark of UCC

CARBIDE AND CARBON CHEMICALS

Carbide and Carbon Chemicals Company
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DOW REPORTS ON PROGRESS IN LATEX PAINT

New latex formulations revolutionize metal finishing

Now, for the first time, a water-thinnable system can perform equally well for metal finishing as traditional solvent systems. For years, rusting has been the big obstacle to using water-thinnable paints. But new Dow latex formulations solve this . . . and provide other exclusive advantages as well.

Dow latex fulfills a need for easier-to-use metal finishes – in both mass and piecework production. Exceptional adhesion and resistance to water have been established. By using water instead of organic solvents, important economies are realized. Solvent recovery systems are no longer needed. Fire insurance rates are lower. And working conditions are improved.

Dow Coatings Research is perfecting a wide range of formulations, particularly in the field of industrial metal primers. To help you make latex metal paints for specific needs, you are invited to use Dow Coatings Technical Service. Phone or write THE DOW CHEMICAL COMPANY, Midland, Michigan – Plastics Sales Department PL1819N.

LATEX T.M.

YOU CAN DEPEND ON DOW

USE Kentucky's HANSA YELLOW 10G NO. 1210

For permanent exterior finishes,
No. 1210 is bright, opaque, strong
and low in vehicle demand.

Most durable bright yellow for { **TRIM ENAMELS** / **LIGHT GREENS** / **MASONRY FINISHES**

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TITANIUM DIOXIDE

R-750 (RUTILE)

Here are two major features of Horse Head R-750 that enable you to speed output and reduce costs of your finishes:

1. **R-750 IS ALL-PURPOSE**—You can replace many of your present grades of titanium dioxide, in a wide variety of interior and exterior finishes, by a single grade—R-750. Thus you cut your inventories and simplify your formulating and production.
2. **R-750 IS EASY MIXING, FAST GRINDING**—You can increase output with R-750 as compared with many grades of titanium dioxide and thereby cut production costs.

To find out how much you can profit by R-750, we suggest you take in a trial shipment now.

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Try these extenders in your own lab

These are natural calcium carbonate pigments processed for the paint industry by Calcium Products Division of the Georgia Marble Company. All are produced from pure crystalline marble and have extremely high dry and wet brightness, low reactivity and relatively low binder demand. They differ in particle size distribution, type of grind (wet or dry) or surface treatment.

GAMACO—water ground product with smallest particle size (98.5% under 10 microns with a mean particle size of 2.5 microns). No surface treatment.

GAMACO-T—a surface treated GAMACO to give better wettability in all water systems.

CALWHITE—water ground product with relatively small top particle size and optimum particle distribution (2-30 microns with a mean particle size of 6.5 microns). No surface treatment.

CALWHITE-T—a surface treated CALWHITE to give better wettability in all water systems.

5-25—water ground product with a particle size distribution of a minimum of both fine and coarse particles (75% between 5 and 25 microns and a mean particle size of 12.5 microns). No surface treatment.

KALMAC—a product like Calwhite in particle size distribution but surface treated to improve dispersion in non-aqueous systems.

NO. 10—a dry ground and air floated product with a broad particle size distribution (90% smaller than 30 microns—99.5% smaller than 44 microns [325 mesh]—10% smaller than 5 microns).

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Lacquer solutions are protected against color build-up during storage

The ability to inhibit color build-up in nitrocellulose lacquers—even after long storage—is but one of the many advantages of Celanese Solvent 601.

This quality solvent compares in solvent power, evaporation rate and other properties to higher cost methyl ethyl ketone...is offered as a replacement in both vinyl and nitrocellulose formulations.

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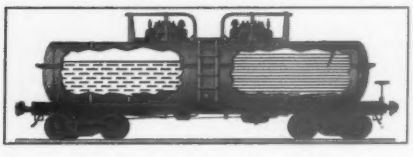
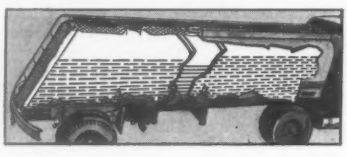
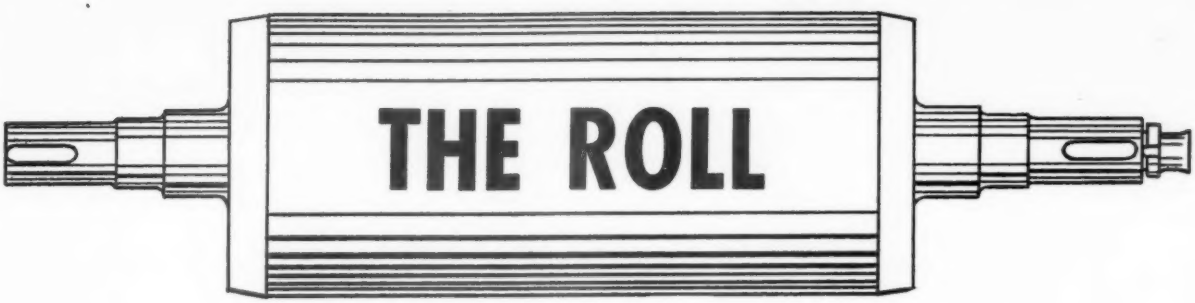
Get the Economy of Split Shipments. Fill *all* your solvent needs with Celanese compartmented tankcar or tankwagon delivery, and enjoy the advantage of CL prices! Available from district storage points in Newark, Chicago, and Bishop, Texas.



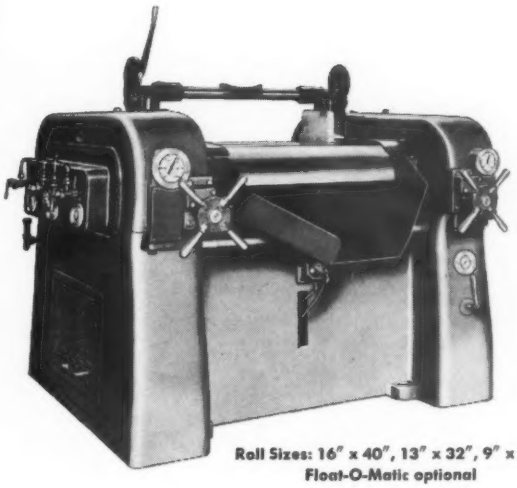


Celanese CHEMICALS

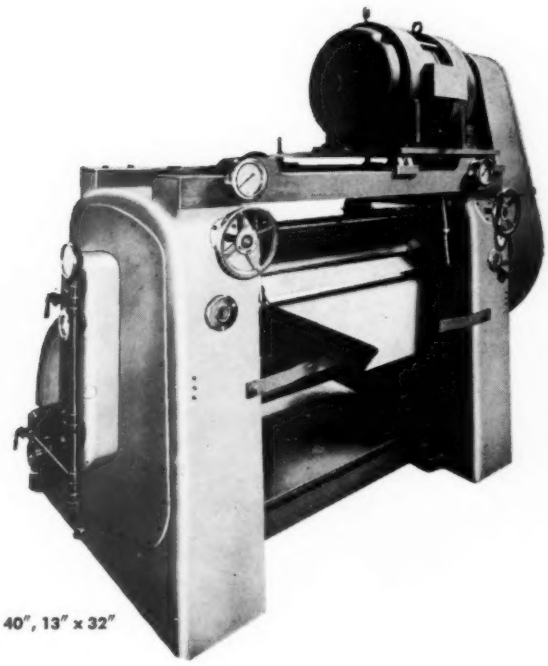


IS THE

HEART OF EVERY MILL



Roll Sizes: 16″ x 40″, 13″ x 32″, 9″ x 24″
Float-O-Matic optional



Roll Sizes: 16″ x 40″, 13″ x 32″

Among the many excellent engineering features that distinguish Lehmann Roller Mills, none is more important than the roll itself. Heat transfer, so vitally important to uniform dispersion (roll coverage), has attained an outstanding degree of efficiency in Lehmann Rolls. This is due to design, material, precision machining, and end head construction.

Centrifugal casting provides an extremely tight, dense grain structure with greater uniformity of hardness at the grinding surface. This chilled white iron roll surface is inseparably bonded to a high quality gray iron core, for maximum strength and resilience. The surface of the roll is bevelled at both ends for side shields.

Unique end head construction insures longer roll life, high power transmission and shock resistance.

Sight-O-Matic* provides three-fold gauge control over: dispersion, take off efficiency, product temperature.

The cost-saving features of Lehmann Mills afford the manufacturer new opportunities, in these days of increasing competition. Let us show you what a modern Lehmann Mill can do for you.

*Reg. U. S. Pat. Off.

LEHMANN®

J. M. LEHMANN COMPANY, Inc.

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Lammert & Mann Co.
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J. M. Lehmann Co., Inc.
Lyndhurst, New Jersey

Manufacturers of quality papers specify Du Pont "TI-PURE" titanium diozide pigment to add brightness and opacity . . . just as makers of quality printing inks specify Du Pont Pigment Colors for fine reproduction. Reprints of this illustration, suitable for framing, are available on request from your Du Pont Pigments representative.

Du Pont Pigments add beauty . . . practicality . . . versatility

NATURE'S WHITE IS RIVALED BY DU PONT TI-PURE®

Whiter than a gull...Du Pont "Ti-Pure" gives paints high hiding power and age resistance

COMPARED with Du Pont "Ti-Pure" titanium dioxide pigments, the whitest of nature's whites seems *gray*. In addition to this remarkable whiteness, "Ti-Pure" gives your paints many other important properties, too . . . when used as the prime pigment.

For example, do you make self-cleaning exterior paints, baked finishes or one-coat interior paints? "Ti-Pure" helps provide the hiding power, the luster, the exact degree of chalk resistance you want in your quality finishes.

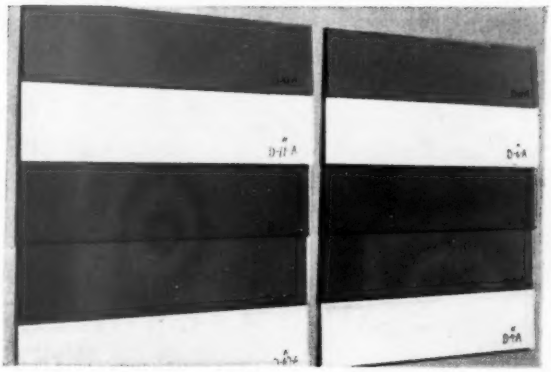
If you make flat paints in pastels for interior or stucco, masonry and asbestos shingles, "Ti-Pure," blended with Du Pont Pigment Colors, can provide just the shade . . . just the hiding power to meet the most exacting requirements. And with all these important advantages, "Ti-Pure" also provides the ability to stand up to wear and weather.

Together with Du Pont's line of quality Pigment Colors and "Ti-Pure," Du Pont offers extensive technical assistance to the paint industry—the result of experience unmatched in the field. For instance, the Du Pont Pigments Test Farm is second to none in its scope and time in service. If you would like help with a pigmenting problem, a paint formulation—or a tour of the Test Farm—call on your Du Pont Pigments representative or write: Pigments Department, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

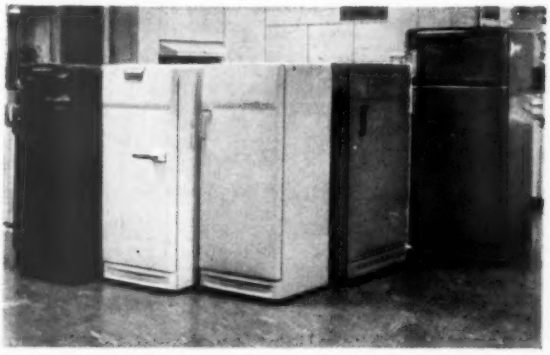
• • •

Here are a few of the fine pigments in the Du Pont line offering the properties you require:

- Ti-Pure® Titanium Dioxide
- Green-Gold—Durable Organic Yellow
- Monastral® Blues and Greens
- Molybdate Oranges
- "Ramapo" Blues and Greens
- Chrome Yellows
- Parachlor Red
- Zinc Yellow
- Toluidine Reds
- Shading Yellow



Performance histories on a wide variety of pigments in a range of vehicles and on all manner of substrate are recorded and compiled at Du Pont Pigments Test Farm.



Test results, offered freely to visiting paint manufacturers, play a significant role in the development and formulation of improved finishes—from paints for automobiles and homes to refrigerators.

PIGMENTS DEPARTMENT

DU PONT

to fine products everywhere

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

ISANO OIL*

$-C\equiv C-C\equiv C-$

Have you ever worked with a vegetable oil with conjugated acetylenic bonds? It offers many interesting opportunities.

■ For example, here are quotes from a report by the U. S. Army Engineers: "The best fire retardant interior paint we have produced is EX #20" (Isano and Linseed Oil). "A good degree of intumescence is obtained by use of isano oil . . ."

■ PVO's first sizable drum shipment will arrive early in 1957. A continuing supply at a reasonable price is assured.

WRITE TODAY FOR SAMPLES, SPECIFICATIONS AND LITERATURE.

62 TOWNSEND STREET
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*ALSO KNOWN AS BOLEKO OIL.

PIGMENT COLORS *for* PAINT

By
George Wormald
Pigments Department
E. I. duPont de Nemours & Co.

THIS SERIES OF ARTICLES ON "PIGMENT COLORS FOR PAINT" WILL RUN IN THREE PARTS. PART I DEALING WITH BLUES AND VIOLETS APPEARS IN THIS ISSUE; PART II DISCUSSING YELLOWS AND ORANGES WILL APPEAR IN OUR APRIL ISSUE; AND PART III COVERING REDS, MAROONS, AND GREENS IS SCHEDULED FOR OUR MAY ISSUE.

THIS SERIES WAS PREPARED EXCLUSIVELY FOR "PAINT AND VARNISH PRODUCTION."

Introduction

PAINT is often described as a mixture of a pigment with some suitable liquid, as a drying oil, varnish or a water dispersion of glue, casein etc., applied to a substrate for its decoration and protection. The modern paint technologist will recognize any such description as an extreme over-simplification. Without going into details, today's paint products embrace an infinite number of mixtures of natural and synthetic oils, resins, solvents, thinners, pigments (both prime and extender) and driers plus a host of accessory agents. The increasing complexity of these mixtures is the result of highly specialized formulation of functional finishes. Obviously, if a finish is to have specific functional properties, some or all of its component raw materials must be functionally selected and herein lies the source of many of the paint technologist's problems. Until the paint formulator has available a complete source of universally applicable raw materials (a kind of paint maker's philosopher's stone), he would be well advised to be as thoroughly familiar as possible with the chemical and physical characteristics of everything he puts into his paint. To assist him, insofar as colored synthetic pigments are concerned, is the object of this review.

In this discussion we shall consider a pigment to be a colored material which is essentially insoluble in the medium in which it is to be dispersed (as opposed to dyes which are soluble). Pigments are produced in a variety of physical forms to satisfy specific working-property or functional requirements.

The term *toner* is used to designate an unextended or undiluted *organic* colorant—one having maximum tinting strength for its type.

Full strength or undiluted *inorganic* pigments are sometimes given a C.P. designation (e.g., C.P. Chrome Yellows, C.P. Chrome Greens, C.P. Iron Blues).

Resinated Toners are organic pigments which may contain as much as 35% by weight of a metallic resinate (e.g., barium or calcium resinate) which is in itself essentially colorless, but the presence of which often improves the dispersion sufficiently to equal or exceed the tinting strength of the parent toner when compared on an equal weight basis under identical grinding conditions.

Lakes are pigments prepared by precipitating a soluble dye on an absorptive translucent base such as alumina hydrate or gloss white. In the case of true lakes, the colorant alone would be considered to have unsatisfactory pigmentary properties (e.g., madder lake).

Extender Pigments are physical mixtures of colorants (either organic or inorganic) with inorganic white or colorless extenders. The extended colors are usually prepared to give special dispersion characteristics in such products as linoleum. They find wide application in print paints for felt base linoleum.

Pastes, Pulps and Press-Cakes are pigments in water-paste form containing from 20 to 60 percent pigment solids, depending on the nature of the pigment. Press-cakes, as the name implies, are obtained directly from the filter press. They are usually characterized by their stiff lumpy appearance and relatively high but uncontrolled solids contents; they find little or no application in the paint industry except in flushing operations.

Paste or Pulp are the terms usually applied to a press-cake which has been further processed to yield homogeneous paste of either controlled solids content or controlled tinting strength on a commodity weight basis.

Pastes, or more particularly, *dispersed pastes* usually contain dispersion aids or surface active agents. They are quite fluid in consistency and have "mix-in" properties; accordingly, they find broad application in aqueous paint systems. Dispersed pastes of low sodium content should be selected for use in those emulsion paints in which efflorescence (Am. Paint J., April 20, 1953) is a problem.

Water-Dispersible Pigments: Many pigments, particularly organic pigments, are hydrophobic. The water-wetting properties of these pigments can be greatly improved by treating them with suitable wetting or surface-active agents. Pigments so treated are called water dispersible dry colors. As in the case of dispersed pastes, water-dispersible dry colors having negligible sodium contents should be selected where efflorescence is apt to be encountered.

Dispersions: Pigments are also available in a variety of dispersed forms from dispersion specialists, who, by the application of specialized skills and equipment, can disperse practically any pigment in practically any vehicle. In this category are the flushed colors, which are dispersions prepared by transferring the pigment from a water paste directly into the liquid paint vehicle. By flushing, the intermediate pigment manufacturing steps of drying and pulverizing are eliminated.

The discussion which follows will be confined to a comparison of chemical and physical properties of colored synthetic pigments of relatively high color intensity. Blacks, whites and extender pigments, although recognized as tremendously important in the paint industry, will not be included.

PIGMENT COLORS for PAINT

Part I --- Blues and Violets

BLUES

Fairly complete hue representation of the blue range of the spectrum is available to the paint technologist in the form of iron, phthalocyanine, ultramarine, indanthrone and basic dye (PTA, PMA and PTMA)* blue pigments and their individual tinctorial variations. The relative advantages and disadvantages with respect to their behavior in conventional paint systems are summarized in Table I.

Iron Blue

There are three common varieties of iron blue, namely, Milori, Chinese and Prussian (or toning blues as they are sometimes called). The three types differ chiefly in color, ease of dispersion and reactivity characteristics. Milori blues are the easiest to disperse and are the least reactive; they are reddest in masstone (plum colored); in tints, they are intense and intermediate in redness between the Chinese and Prussian varieties.

Both the Chinese and Prussian blues are jet in masstone, but Prussian blue is considerably redder and less intense in tint than Chinese blue. Because of their jet masstones, both are used to shade blacks. Prussian blues are the hardest to disperse and are somewhat more reactive than Chinese blues.

* Phosphotungstic acid, phosphomolybdic and phosphotungstic molybdic acid.

Pigment	Advantages	Disadvantages
Iron Blues (C.I. 1288)**	Low cost. High tinting strength. Good durability and light fastness in masstone and dark tints. Excellent bleed resistance.	Fair lightfastness in light tint. Poor can storage color stability in light tints in presence of oxidizable vehicles. Poor alkali resistance.
Phthalocyanine Blue (Pr: 481)***	Very high tinting strength. High degree of color intensity. Excellent light fastness even in light tints. Excellent chemical resistance. Excellent baking resistance. Excellent bleed resistance.	High cost except in light tints. Tendency to bronze in dark shades. Special forms required for flocculation resistance. Some forms not crystal stable.
Ultramarine Blue (C.I. 1290)**	Low cost. Good alkali resistance, except lime. Excellent heat resistance. High color intensity.	Very poor acid resistance. Low hiding power. Low tinting strength. Poor outdoor durability in all shades. Poor wetting in organic vehicles. Sensitive to discoloration due to formation of metal sulfides (e.g., Pb and Fe).
Indanthrone Blue (C.I. 1112)	Good outdoor durability in all depths of shade. Good chemical resistance. Good bake resistance. Good bleed resistance.	High cost except in light tints. Moderate color intensity in tints.
Precipitated Basic Dye Blues (PTA, PMA & PTMA) Pr: 198	High tinting strength. High color intensity.	High cost except in light tints. Poor outdoor durability, especially in tints. Poor bleed resistance.

**Colour Index—Society of Dyers & Colourists (1924)
***Prototypes—American Assoc. of Textile Colorists & Chemists, Vol. 31 (1955)

Table I. Advantages and disadvantages of various blue pigments.

Although there are some modified iron blues which have improved alkali resistance, none is truly alkali resistant. They are subject to color change if used in alkaline paint systems or applied over alkaline surfaces.

Iron blues are also characterized by their tendency to be reduced in the presence of oxidizable vehicles (e.g., linseed oil). Accordingly, light iron blue tints (or color containing iron blue), in oxidizable vehicle systems, exhibit a pronounced tendency to lose blueness on storage in the can. The blueness will often recover when the paint is brushed out and exposed to the air; the recovery, however, may be incomplete and streaky. Also, it is hazardous to store unground mixer pastes of iron blue in vehicles such as linseed oil; the chemical reduction process is exothermic and may cause a fire.

Iron blues have good light fastness in masstone or deep shades. At these levels, however, they tend to bronze; this tendency is greatest in the Milori type and least in the Prussian type. The gloss retention also leaves something to be desired. When highly extended, iron blues show pronounced fading on exterior exposure. The durability of iron blue finishes can be upgraded by blending with phthalocyanine blue. Iron blues may serve as a degradation catalyst for some polymeric resins and binders (e.g., rubber and vinyls) when exposed to heat and/or ultraviolet light.

Most iron blue pigments exhibit a tendency to absorb moisture from humid atmospheres and release moisture to dry atmospheres. In areas of high humidity, some iron blues may contain as high as twelve percent total water (as determined by toluene distillation). The moisture content of the pigment may significantly influence its rate of grit elimination in roller mill dispersions; the higher moisture contents facilitate pigment aggregate size reduction. In pigment mixtures containing iron blues (e.g., chrome greens), however, moisture may also influence flooding; the direction of the influence (i.e., increasing or decreasing) being directly associated with the type of vehicle employed. (1)

Phthalocyanine Blue

Perhaps the most important development of recent times was the discovery and commercial production of phthalocyanine blue in Great Britain about 1927 to 1933 (10). Manufacture of phthalocyanine blue in this country began about 1936.

The phthalocyanine pigments (2, 3) are generally regarded as representing the highest standards for light fastness, heat stability and chemical resistance among all organic pigments. During the past twenty years, much has been learned concerning the working properties of the phthalocyanines, and this experience has led to their further improvement. Accordingly, phthalocyanine blue pigments are now available in a variety of "tailormade" modifications (9).

In their commercial infancy, phthalocyanine blue toners were characterized by poor texture. This deficiency, however, was largely overcome by resination (i.e., treatment with metallic resinates) (4). These resinated toners, in addition to their superior ease of grit elimination, also provided better millbase flow properties (less buttery) in many paint vehicles. Resinated pigments in paint systems containing acids (e.g., maleic acid) may exhibit poor viscosity stability on storage (reactivity). The texture and flow characteristics of the non-resinated types has, in recent years, undergone very substantial improvement.

Crystallinity

An important part of the technology of the phthalocyanines was the recognition that the blue pigment crystal can exist in two forms, which Von Susich (5) refers to as the alpha and beta configurations. There is some disagreement among manufacturers as to which crystal form should be called alpha and which should be called beta. Suffice it to say, however, that one form which we shall designate as "alpha", (following the practice of Von Susich) yields a blue pigment which is jet in masstone and red in tint relative to the other form which we shall designate as "beta". The beta form is light and red in masstone, somewhat superior in bronze resistance, slightly weaker and distinctly greener in tint. Of the two crystal forms, the beta phase material is the more stable as evidenced by the fact that the alpha phase material will change to the beta phase when exposed to high temperature (500° to 600° F.).

Resistance to crystal growth is recognized as a very important property of phthalocyanine blue pigments for use in organic coatings. In the presence of thinners or solvents (particularly aromatics), some phthalocyanine blues exhibit a loss of strength on storage in the can which microscopic examination reveals to be related to particle size growth as indicated by the presence of relatively large needle-like crystals. Tinting strength lost as a result of crystal growth cannot be recovered by any reasonable amount of re-grinding of the paint. The resistance to crystal growth of the phthalocyanine blue pigment can be easily and quickly appraised (6) by digesting the pigment in xylol for 15 minutes at 100° C., and viewing a drop of this slurry under a microscope at approximately 200 magnifications. If the digested sample shows a significant increase in concentration of needle shaped crystals in comparison to a freshly prepared slurry of the pigment in cold xylol, the pigment may be considered to have poor resistance to crystal growth. With some exceptions, phthalocyanine blue pigments which exhibit good resistance to crystal growth are generally greener in tint (although of the same crystal configuration) than those having poor resistance to crystal growth; the reason for this being that good resistance to crystal growth may be obtained by partial chlorination of the alpha phase phthalocyanine blue molecule. The beta phase phthalocyanine blue, although essentially chlorine-free, is inherently resistant to crystal growth.

Flocculation

A deficiency of some phthalocyanine pigments is their tendency toward flocculation. In this case, loss of tinting strength occurs when the original finely dispersed blue pigment particles gather together as loose clusters in the unagitated paint or wet paint film. These clusters or flocculates can usually

be redispersed by vigorous agitation or mild shearing action. Obviously, such a condition gives rise to poor color uniformity in many paint applications. Fortunately, special flocculation-resistant forms, such as aluminum benzoate lakes (7) and sulfonated phthalocyanines (8) are available which essentially eliminate flocculation difficulties in most conventional paint systems. Recent experience with odorless systems, however, indicates that careful formulation and product evaluation is necessary with certain vehicles, even with flocculation resistant types of phthalocycanine blue.

Although traces of copper (in ionic or soluble form) exert a pronounced deleterious effect upon the aging characteristics of rubber (11) when exposed to air, the copper in the phthalocyanine blue molecule is so firmly bound that it is not available for reaction as a degradation catalyst. It should be understood that the pigment must be essentially free of soluble or ionizable copper compounds, however, to be safe in most rubber compounds.

Another characteristic (in many cases, particularly in polychromatic finishes, a very desirable characteristic) of phthalocyanine blue is its polychroism; the reflected color of the phthalocyanine pigment particle is red and bronzy whereas the transmitted color is relatively very much greener. Accordingly, if the aggregate size reduction of the blue pigment in a paint is poor, deep shades will appear red, dull and bronzy, and in metallics (i.e., finishes containing finely divided non-leafing aluminum flake as a significant portion of the total pigment), the two-tone or "flip-flop" will be poor. Conversely, jetness of masstone (i.e. reduced red bronze) and contrast in "flip-flop" of metallics are increased as the pigment particle (aggregate) size is decreased. Furthermore, the covering power of the blue will increase to a maximum when the particle size reaches approximately that of the wave length of the colored light reflected by it (i.e., approximately 0.40-0.45 microns) (12). The ultimate particle size of pigmentary phthalocyanine blue toners is in the range of 0.045-0.060 microns in diameter as determined by specific surface measurements. It is apparent, therefore, that large aggregates (relatively speaking) contribute to low hiding power, low tinting strength, poor color intensity, dullness of masstone and poor "flip-flop" contrast characteristics (in metallics) in phthalocyanine blue finishes. These relatively large particles may be the direct result of poor initial dispersion, or, they may be the indirect result of crystal growth and/or flocculation in an initially excellent dispersion.

The phthalocyanine pigments are perhaps best known for their outstanding light fastness in metallized polychromatic finishes and in pastel shades. As a matter of fact, full realization of their inherent excellent color retention is not attained in conventional binder systems because of white or aluminum pigment chalk-fading. The recently publicized acrylic lacquers and "super" alkyd enamels (20) are expected to offer a distinct advantage in this connection.

On the negative side, phthalocyanine pigments are also recognized for their characteristic bronzing in masstone, deep tints and metallics. Here too, the rate and degree of bronze is influenced by the binder and, furthermore, considerable variation in bronze resistance is found among the many varieties of phthalocyanine pigments. Some beta phase blues, for example, are far superior to many alpha phase blues in bronze resistance.

The film integrity (i.e., resistance to checking, cracking etc.) of properly formulated phthalocyanine pigment finishes is excellent. Formulation of a finish at too low a pigment volume concentration will, of course, result in poor film integrity; this applies to any pigment.

In summary, then, although phthalocyanine blues offer a wealth of desirable pigment properties for use in paint (e.g., high tinting strength, high color purity, excellent chemical resistance and light fastness etc.), a single pigment has yet to be discovered which will give optimum performance in all paint systems. Accordingly, the paint technologist, in order to obtain optimum performance and money value, should be familiar with the behaviour of the various phthalocyanine blue pigment modifications in his own particular products.

Ultramarine Blue

Ultramarine blue (14), prepared by calcining a mixture of either soda ash or sodium sulfate with clay, sulfur and some form of carbon (13), is characterized by its distinctive brilliant red-shade of blue not readily matched with any other pigment or pigment combination. Its warmth of color and high tinctorial purity coupled with its low cost (commodity basis), good alkali resistance (except lime), good heat stability (250-300° F.) and excellent bleed resistance in organic solvents render ultramarine blue particularly suitable for interior architectural, household, machinery and toy enamels and as a shading agent for white paints. For special applications, the high infra-red reflecting property of ultramarine blue offers definite advantage.

On the other hand, one of the factors which restricts broader application of ultramarine blue in paints is its very poor acid resistance, which confines its use in vehicle systems of low acidity as well as its application to acid-free surfaces and in acid-free atmosphere. The so-called acid-resistant ultramarine blues are not actually acid resistant but do have improved resistance to alum. Its poor hiding power and low gloss preclude its use as the sole pigment in most paints. Ultramarine is not durable (poor film integrity) on outdoor exposure. Since ultramarine blue contains sulfur, special attention is required in formulating in order to avoid discoloration due to black metal sulfides (e.g., lead sulfide).

Indanthrone Blue

Indanthrone blue is a member of a group commonly referred to as "vat dye pigments" (15, 16). The term "vat" does not identify the chemical structure of the color but rather its method of application in the textile industry. As a pigment in toner form, it is between two and three times more

expensive (on a pound basis) than a phthalocyanine blue toner. Accordingly, economic considerations limit the use of indanthrone blue to those paint systems requiring only small amounts of the pigment (e.g., tints, shaded blends and some metal coating lacquers) but which also demand excellent durability, light fastness and bleed resistance. Relative to phthalocyanine blue, indanthrone blue is considerably redder in hue and superior in bronze resistance. Light fastness is excellent. Although it is conceivable that any pigment may exhibit a tendency to flocculate under certain specific conditons, indanthrone blue is generally considered much more flocculation resistant than the non-flocculation resistant varieties of phthalocyanine blue. Similarly, indanthrone blue shows no tendency toward crystal growth in conventional paint thinners or solvents.

Because of the high cost, high tinting strength and, to a lesser extent, the moderately hard texture of indanthrone blue toners, resinated toners and extended forms (often called lakes) are more commonly used in the paint trade. The resinated indanthrone toners are subject to the same reactivity behavior in the presence of acids as discussed in the case of resinated phthalocyanine blue pigments. For those paint systems where moisture in the coating composition must be controlled at a very low level, the paint technologist should know that the extended forms (lakes) of indanthrone blue usually contain relatively large amounts of alumina hydrate.

Precipitated Basic Dye Blues

The more commonly used pigments of this group are the so-called PTA, PMA and PTMA pigments. They are so designated because they comprise the precipitated products of the reaction between basic dyes (e.g., Victoria Blue B) and complex inorganic acids such as phosphotungstic and phosphomolybdic acids or their mixture (17, 18, 19). These pigments as a group are nearly black in masstone; accordingly, they are used chiefly for tinting purposes. In spite of certain deficicncies (e.g., poor bleed resistance and poor light fastness on outdoor exposure) the brilliance and high tinting strength of these pigments make them suitable for various interior paints of more-or-less special character (e.g., foil lacquers, poster paints and some toy enamels). In general, PTA pigments are more light fast than corresponding PMA pigments, although the latter are somewhat superior in tinting strength.

Tabulation of Property Data

In Table II are listed "order-of-magnitude" property comparison values for the blue pigments previously discussed. These values represent a broadly generalized appraisal of the average relative performance of the pigments in a variety of conventional paint sys-

	Light fastness		Outdoor Durability		Rel. Tint. Str. Index	Rel. Cost Index at equal Strength	Relative Hiding Power	Grinding Properties	Baking Prop.	Can Stability		Spec. Grav. (approx.)	Resistance		Bleed Resistance				Chem. Resist.	
	Dark Shade	Pastel	Dark Shade	Pastel						Dark Shade	Pastel		Cryst. Growth	Flocculation	Alcohol	Linseed Oil	Aliphatic	Aromatic	Acid	Alkali
Iron Blues																				
Milori	e	f	e	f	15	1	m	e	e	e	f**	1.8	e	e	e	e	e	e	e	p
Chinese	e	f	e	f	–	1	m	g	e	e	f**	1.8	e	e	e	e	e	e	e	p
Prussian	e	f	e	f	–	1	m	g	e	e	f**	1.8	e	e	e	e	e	e	e	p
Phthalocyanine Blues (partially chlorinated)																				
Toner (alpha)* chlorine free	e	e	b	e	12	6	l	e	e	g	p	1.6	p***	p	e	e	e	e	e	e
" (beta)* chlorine free	e	e	b	e	–	6	l	e	e	e	f	1.6	e	p	e	e	e	e	e	e
" (alpha)*	e	e	b	e	–	6	l	e	e	e	f	1.6	e	p	e	e	e	e	e	e
Flocculation-resistant toner (alpha)*	e	e	b	e	–	6	l	e	e	e	e	1.6	e	e	e	e	e	e	e	e
" " resinated toner (alpha)*	e	e	b	e	–	6	l	e	e	e	e	1.5	e	e	e	e	e	e	e	e
" " 50% lake (alpha)*	e	e	b	e	24	8	l	e	e	e	e	1.5	e	e	e	e	e	e	e	e
Ultramarine Blue	e	e	p	p	200	6	l	f	e	g	e	2.3	e	e	e	e	e	e	vp	e(†)
Indanthrone Blue Toner	e	e	e	e	13	20	l	g	e	e	e	1.5	e	e	e	e	e	e	e	e
Resinated Indanthrone Blue	e	e	e	e	–	–	l	e	e	e	e	1.5	e	e	e	e	e	e	e	g
Indanthrone Blue Lake (35-40% toner)	e	e	e	e	–	–	l	e	e	e	e	1.8	e	e	e	e	e	e	e	g
PTA Blues	g	p	f	p	7	5	l	e	g	e	g	2.3	e	e	p	f	f	f	e	f
PMA Blues	g	p	f	p	7	5	l	e	g	e	g	2.3	e	e	p	f	f	f	e	f

*Von Susich designations (5); ** Reduced by oxidizable vehicles; ***Some chlorine-free alpha products have recently been developed which are crystal stable.

Legend: b=bronze; e=excellent; f=fair; g=good; l=low; m=medium; p=poor

(†)except lime

Table II. Property comparison values of blue pigments.

tems. Obviously, any accurate quantitative measure of any one of these or other properties would necessarily be very specific to the particular pigment, vehicle, solvent and other ingredient samples used, as well as to the method and equipment employed in effecting the dispersion, and the test procedure and equipment used for the determination. Accordingly, the data presented in Table II (and similar tables for other colored pigments) can serve only as a rough guide for the paint technologist.

Tinting Strength Index

The numerical values indicate approximately the number of pounds of one pigment (commodity basis) which would be equal in tinting strength to the indicated number of pounds of another pigment; the pounds of prime white in all cases being constant. Hence, 24 pounds of a 50% phthalocyanine blue lake would be equal in tinting strength to 12 pounds of phthalocyanine blue toner.

Relative Cost Index

The numerical values given are in direct proportion to the costs of the various pigments to obtain equal tinting strength. Hence, Basic dye blues are five times more costly than iron blue at equal strength.

VIOLETS

The major role of violet pigments in the paint industry is that of a shading and toning agent for blues, reds, grays, whites etc. Since in either case the violet pigment is present in relatively small amounts, cost is not usually a controlling factor; however, the use at low concentrations does impose rather rigorous demands with respect to some end-use properties. For example, as a shading agent for durable blue and maroon finishes, the violet pigment must have good light fastness at high degrees of dilution. For baked enamels (including whites) it must have good bake resistance at low pigment concentrations. It must have bleed resistance characteristics consistent with the quality of the finished product and, particularly for use in whites for refrigerator and washing machines, it must have a high degree of chemical resistance.

As in any other color group of pigments, there is no single violet pigment which is universally satisfactory; accordingly, we find four or five violet-shade pigments in common use. Selection of any one pigment for a particular property (or combination of properties) necessarily represents a compromise on some other property or properties. As in the section on blue pigments, the relative advantages and disadvantages of the more commonly used violet pigments are summarized in Table III.

Pigment	Advantages	Disadvantages
Dibenzanthrone Violet *(CI: 1104)	High tinting strength. Good light fastness at high dilution. Excellent acid and alkali resistance. Excellent bake resistance except in whites. High color purity.	High cost (weight basis). Fair bleed resistance. Poor high bake resistance in white finishes.
Helio Fast Rubine 4BL Lake **(Pr: 406)	Moderate cost, high color purity. Excellent alkali and good acid resistance. Excellent light fastness in dark shades. Good bleed resistance.	Fair to poor light fastness in pastels. Poor high temperature bake resistance.
Thioindigoid Maroon *(CI: 1207)	Excellent chemical resistance. Excel. light fastness in dark shades. Good bake resistance. Good light fastness at high dilution.	High cost. Masstone bronze. Some varieties bleed in lacquer and aromatic solvents.
Mineral Violet	Excellent light fastness. " bake resistance. " acid resistance. " bleed resistance. Low cost.	Very low tinting strength. Poor alkalai resistance. Low color purity. Hard grinding.
Precipitated Basic Dye (Violets—PTA, PMA & PTMA)	Very high tinting strength. Very high color purity.	High cost. Poor outdoor durability—especially in pastels. Poor bleed resistance.

*Colour Index number.
**Prototype—Amer. Assoc. of Textile Colorists & Chemists, Vol. 31 (1955).

Table III. Advantages and disadvantages of various violet pigments.

Dibenzanthrone Violet

Dibenzanthrone violet† is a vat dye pigment of excellent light fastness. Although possessing very good light fastness in weak pastel shades, dibenzanthrone violet is not equal to phthalocyanine blue in this respect. Bleed in oxygenated and aromatic solvents and high price limit its use considerably. Dibenzanthrone violet finds application as a shading or toning agent for blue, maroon and gray automotive finishes, high grade industrial finishes and as a toning agent for white finishes. High temperature baking schedules should be avoided when the violet is used in very low concentrations since it tends to lose color under these conditions. To provide a pigment of satisfactory dispersing characteristics, this pigment is usually sold in resinated or extended form.

† Marketed under the names "Platinum Violet" and "Indo Violet".

Helio Fast Rubine 4BL Lake

This pigment is marketed as an alumina hydrate lake; the parent toner is hard and horny when dried and, consequently, too difficult to disperse. It is black in masstone but yields a purple tint on reduction with white. Because of its high alumina hydrate content (as much as 60%), viscosity stability may be a problem in some highly pigmented tinting bases or

enamels. The lake is quite transparent, a factor which should be considered when using it in appreciable amounts to shade maroon finishes. Its good light fastness in dark shades, high color intensity, good chemical and bleed resistance and moderate cost make Helio Fast Rubine 4BL lake particularly suitable for shading full shade durable maroon finishes when used in concentrations of 10% to 30% of the total pigmentation. On the other hand, its poor light fastness in very weak pastel shades plus its poor bake resistance at high temperatures make it unsuitable as a white toning agent for high bake exterior white finishes.

Thioindigoid Maroon

Thioindigoid maroons are maroon in masstone and violet in tint. They are considerably bluer than most organic maroon pigments, and find application in shading durable maroon finishes. Generally speaking, thioindigoid maroons are not bake resistant enough, nor sufficiently light fast in weak tints to be used effectively as toning agents for whites. Some varieties bleed slightly in aromatic and ketone solvents. The non-bleeding types find extensive use in automotive finishes.

Mineral Violet

Mineral Violet (also called Manganese, Permanent, Fast and Nurnberg violet) is an inorganic pigment, namely, a complex manganese ammonium phosphate. Its very low tinting strength, low color intensity and low hiding power largely restrict its use to toning white finishes, in which service it offers excellent light fastness, low cost, and excellent bake and bleed resistance. Because of its poor alkali resistance, it is not suitable for some household appliance finishes; in such cases, dibenzanthrone violet can be used to advantage.

Precipitated Basic Dye Violets

The general properties of the phosphotungstic or molybdic acid violet pigments in paint are essentially the same as those previously discussed in the section on precipitated basic dye blue pigments. Because of their brilliant violet color, however, they do find additional application as toning agents for interior, poster and toy enamel whites. In Table IV are listed "order-of-magnitude" property comparison values of the violet pigments previously discussed.

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	Light fastness		Outdoor Durability		Rel. Tint. Str. Index	Rel. Cost Index at equal Strength	Relative Hiding Power	Grinding Properties	Baking Prop.	Can Stability		Spec. Grav. (approx.)	Bleed Resistance				Chem. Resist.	
	Dark Shade	Pastel	Dark Shade	Pastel						Dark Shade	Pastels		Alcohol	Linseed Oil	Aliphatic	Aromatic	Acid	Alkali
Dibenzanthrone Violet	e	e	e	e	10	8	low	f	e*	e	e	1.5	e	e	e	p	e	e
Helio Fast Rubine 4BL Lake	g	f	g	p	33	3	low	g	g	e	e	1.8	f	e	e	e	e	e
Thioindigoid Maroon	e	g	g	g	25	5	low	f	f	e	e	1.6	g	e	e	g	e	e
Mineral Violet	e	e	used only as toning agent for white		34	22	low	p	e	e	e	2.7	e	e	e	e	e	p
Precipitated Basic Dye Violets—PTA Methyl Violet Toner	g	p	p	p	7	1	low	e	g	e	g	2.5	p	e	e	f	g	f

*Except in very low concentrations with white
Legend: e=excellent, f=fair, g=good, p=poor

Table IV. Property comparison values of violet pigments.

WHAT TO LOOK FOR in USED LIFT TRUCKS

Sizeable numbers of used lift trucks are being purchased by the paint industry. They can be a good investment or a source of trouble—depending on the care with which they are selected. Here is a 19-point checklist that will help operators to get the right truck for their jobs

By
R. F. Moody*

WHEN a used lift truck is being considered for purchase, both its basic specifications and its operating condition should be carefully analyzed before a commitment is made. A reputable dealer will provide invaluable assistance, but in most instances, the potential customer knows his requirements and his plant far better than any outsider. Being aware of the factors to consider, he will be in a better position to advise the dealer of his needs.

For buying a used lift truck is not like buying a second-hand car. With a car, almost any model of any make is available in the immediate vicinity of a prospective buyer. But lift trucks are made in substantially fewer numbers than automobiles, and each truck must be matched against the jobs that it is to perform and the areas in which it is to perform them. Thus, getting the right truck for the right job is much more difficult—and requires more careful analysis—than purchase of a car that is to be used only for transportation.

Secondly, a lift truck is a piece of capital equipment. If it breaks down, more than inconvenience results: Production schedules are disrupted, time is lost, operating costs mount. So if a used truck is being bought for production operations—or even if it is to be used only for standby service—care and skill must be exercised in analyzing its condition.

Why Buy Second-Hand Equipment?

If this is the case, why should a used truck be considered at all. New equipment is obviously more reliable, safer, and has refinements that are unavailable in used models, even though they be of recent vintage.

Of the numerous reasons, one is most important: lower first cost. The amount that can be saved by purchasing second-hand equipment depends entirely on the individual

Using a lift truck to store raw materials

*Mr. Moody is associated with the Hyster Company. This article was prepared especially for Paint and Varnish Production.

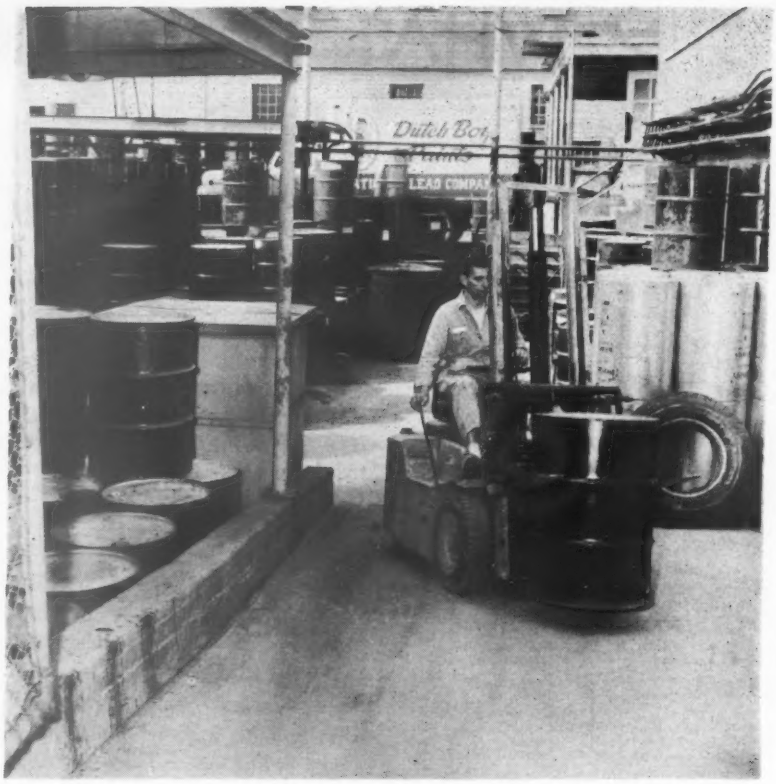
truck. Generally, used trucks are offered under one of two conditions, "as is" or "rebuilt". Actually, some manufacturers, such as the *Hyster Company*, suggest three basic categories for used lift truck equipment, "as is", "good value" or "hy-quality". The "hy-quality" tag is confined to trucks that are rebuilt to factory standards and are warranted for a fixed period of time. The "good value" tag is applied to a truck that has been put in first-class operating condition but not necessarily completely rebuilt, where the "as-is" truck is exactly as stated—in the same condition as it was when traded.

Most dealers do some work on trucks that are over four or five years old. If the second-hand truck that you are considering is of this age and has been reconditioned but not rebuilt, it can be expected to have a life of 60-70 percent of that of a new truck. If, on the other hand, it is only three to four years old, and again is properly reconditioned but not necessarily rebuilt, it should have a useful life of 75-85 percent of a new truck. The life of a rebuilt machine, on the other hand, should approximate 90 percent of the life of a new machine. Naturally, these are general figures and apply to the mechanical condition of a truck operated under normal conditions and receiving normal maintenance.

Yet, the cost of used equipment is not proportionate to its anticipated life. It is less. Again, how much less depends on the machine and on local circumstances. It may be as little as 30 percent, as much as 70 percent. . .but regardless of the percentage, there can be a substantial saving.

Naturally, savings are important when capital is limited, and therefore a used truck is often purchased by the small manufacturer or distributor. It allows him to mechanize his operations and save approximately the same amount of time and money as when using new equipment. Many used truck purchasers are companies that never have owned a lift truck before.

This is not always the case, however, for larger companies frequently buy used equipment to supplement existing fleets during peak production periods, either daily or seasonal. Since a used truck costs less, the depreciation that must be charged against it as overhead when it is not working is much less than what might be charged against a new machine, and therefore a used truck frequently provides a good answer to the "standby" equipment problem.



Transferring raw materials to production area with the use of a lift truck

Still another reason for buying a used lift truck is to fulfill production requirements while waiting on new equipment. In today's market, delivery of some models of lift trucks, and particularly those requiring a large amount of special engineering, are available only on several month's delivery. Utilizing a second-hand truck to meet immediate production demands is often the most economical solution to this problem.

How to Get the Right Truck

The first requirement for a lift truck—either new or used—is that it be adaptable to the job the prospective buyer has in mind and that it be capable of operating efficiently in his plant, yard, or warehouse. Therefore, the same basic conditions that must be analyzed when selecting a new truck apply also to a used one:

(1) Obviously the truck must have the rated capacity to lift the loads in the potential buyer's plant. Most buyers like to obtain a machine rated at somewhat higher capacities than the maximum size load that they normally encounter just in order to be safe. This is good practice, but there is a limit, for the efficiency of a truck is greatest when the loads that are handled are closest to the machine's rated capacity. Operating costs, too, are less.

But, capacity is not the entire story. Trucks are rated at a capacity of a given load center, generally 24 inches. This means that if the normal load is wider than 48 in., the truck capacity is decreased. So, this is an important factor to check—namely, rated capacity at the required load center.

(2) Other basic considerations are lowered mast height and truck

stacking height. On occasion, buyers have purchased lift trucks only to find that the lowered height of the machine was higher than their doorways and thus that there was no way to get the truck from one area of the plant to another. . .or that the truck was incapable of stacking to the desired height, thus wasting valuable warehouse or storage space.

(3) The amount of under-clearance affects the areas in which a truck can be used, and here there are two requirements, as shown in Table I—namely, the under-clearance under the uprights and also under the center of the frame. Too little clearance may cause the truck to "hang-up" on ramps or in yards.

(4) Floor loading is important, particularly in older plants, so the total weight of the truck with and without load should be considered before purchase. There is actually no way of quickly determining the structural capacity of an old building other than to refer to construction prints if they are available, or to make an engineering survey. However, obviously it would not be wise to buy a 10,000-lb. capacity truck that would weigh on the order of 13,600 lb. and carry a 10,000-lb. load without carefully checking the ability of the floor and building to carry it.

The determining factor, of course, is not total weight but rather its distribution; a four-wheeled machine with pneumatic tires will distribute weight and load over more floor area than a similar machine with solid or cushion tires. Checking with the dealer on both of these considerations is a wise precaution.

If the truck is to be used in an elevator, then weight alone is the dominant characteristic, whereas if the vehicle will operate inside of a trailer, both weight and floor loading are important.

(5) Finally, the type of tires that are on the truck govern to a large extent where it can be used. Solid tired machines, for example, are not adaptable for outdoor use. Pneumatic tired machines can be used either in or out of doors, as can, to a lesser extent, a solid-cushion machine. Again, these

Finished goods on pallets being stored

are points to consider when looking at a second-hand truck.

Naturally, there are many other considerations, Table II. Some of these may be unimportant in particular applications—others may govern whether or not the truck can be used successfully. But in any case, they should be carefully checked if maximum benefit is to be obtained from a used machine.

How to Determine Truck Condition

Over and above the factor of ability to meet a given requirement is the mechanical condition of the truck being considered. There are many points that should be checked here, perhaps the most important of which is that the purchaser buy from a dealer who represents a well-known and reputable lift truck manufacturer. But more than that, any dealer likes his customer to know precisely what he is getting. There is less possibility for misunderstanding. . .both parties to the transaction are satisfied after the sale is made. Among the things that can be checked are the following:

(6) If the truck has been reconditioned and is warranted, obviously used parts are available. If, however, it is offered in the "as is" condition, the prospective buyer should determine whether replacement parts can be obtained. Depending on the manufacturer, service parts generally are available for machines ranging from 10 to 20 years old. However, they may not be available from stock for the older machine, and this will involve a delay if the truck breaks down. It always is wise to check to inquire if the dealer has a replacement parts book that lists the parts for the particular truck in question. . . and what parts he has in stock.

(7) The manufacturer's name is an important consideration. Like many other industries the fork truck industry has consolidated, and some trucks were made in earlier years that are no longer on the market. A used truck with an obsolete name is a poor buy.

(8) A rebuilt truck, of course, is usually in better condition than one that is offered "as is". Generally,

Type of Truck:	
Make:	
Model:	
Serial No.	
Year:	
Availability of Replacement parts:	
Rated Capacity, lbs.	
At Load Center, in.	
Load Arms length, in.	
Thickness, in.	
Width, in.	
Lift Height, in.	
Overall lowered height, in.	
Free lift, in.	
Turning Radius:	
Aisle Widths	
90 deg stacking, in.	
90 deg intersecting, in.	
Max. Grades	
Percent no load	
Percent full load	
Operating Speed	
Travel speed:	
Lifting speed:	
Underclearance	
Under uprights, in.	
Under center, in.	
Approximate Weight:	
Floor Loading (With full load)	
Type Tires:	
Type Power:	
Accessories	
Guards, load:	
Overhead:	
Power steering:	
Automatic transmission:	
Hour meter:	
Fire extinguisher:	
Towing hook:	
Others:	
Special Attachments	
Boom:	
Scoop:	
Hydraulic clamp:	
Others:	

Table I. General Truck Specifications

it has been steam-cleaned and painted; the frame has been repaired by welding, if necessary; it has a new clutch and new brake lining; the engine has been rebuilt; the hydraulic system has been overhauled; wheel bearings have been checked and packed; tires are in good condition and other components have been checked and repaired. In some instances, however, an "as is" truck is an excellent buy; unusual circumstances may have required the former owner to trade it in. If his name can be determined, he can be asked. Otherwise, the general reputation of the dealer can be relied upon. He is a businessman, and probably has hopes of selling the used truck buyer new machines at some future date. He wants a satisfied buyer as much as the buyer wants a good used truck.

(9) Most used trucks do not come equipped with attachments other than forks. This, of course, is not always the case. A machine may have mechanical or hydraulic attachments which, if they can be used, are a "plus" in the sale.

However, the buyer who purchases a used truck with the idea of fitting a new hydraulic attachment to it sometimes is faced with a costly or possibly an insurmountable problem. Current attachments may not be adaptable to obsolete trucks. Thus, a very cautious approach is recommended when purchasing a used machine to which a new hydraulic attachment is to be fitted. With mechanical attachments, the problem is usually much simpler.

(10) A visual check of the truck is obviously wise. Unless the prospective buyer knows the dealer well, it is wise to look at the truck in question rather than merely at a picture. Its general appearance, cleanliness, and absence or presence of waste, dirt, and grease is a good indication of how well the truck has been maintained.

(11) Mechanical condition is, of course, very important.

Among other things that the buyer will want to check will be the action of the clutch pedal to determine whether it has the proper amount of "free pedal travel";

VISUAL INSPECTION

General Appearance: Good _____ Bad _____
Paint : Good _____ Bad _____
Fenders: Damaged_____ Good Condition_____
Guards : Damaged_____ Good Condition_____
Other : _____

Uprights:
Condition: Good_____Repaired_____Damaged_____Rollers_____Slides_____

Chains: Drive Chains_____Sprockets_____Hoist Chain(s)_____

Frame:
Condition: Out of Line_____Welded_____Repaired_____Needs Repair_____Good_____

Tires:
Type:_____
Condition: Load (Front)_____Steering (Rear)_____

OPERATIONAL INSPECTION

Engine:
Make_____Model_____Serial_____Number of Cylinders_____
Condition: Good_____Bad_____Smoking_____Noisy_____Knocking_____
Needs: Replacing_____Overhauling_____Minor Adjustment_____Nothing_____

Clutch:
Condition: Slips_____Grabs_____Needs Replacing_____Needs Adjustment_____

Transmission:
Operated in each of these speeds Forward: 1_____ 2_____ 3_____ 4_____ 5_____
Operated in each of these speeds Reverse: 1_____ 2_____ 3_____ 4_____ 5_____
Condition: Noisy_____Good_____Needs Adjustment_____Needs Replacement_____

Differential:
Condition: Noisy_____Good_____Needs Adjustment_____Needs Replacement_____

Hydraulic System:
Hoist Cylinder: Leaking_____ Good_____ Needs Repacking_____ Bad_____
Tilt Cylinder(s) Leaking_____ Good_____ Needs Repacking_____ Damaged_____

Pump: Good_____Noisy_____Leaking_____Slow Acting_____

Valves: Good_____Leaking_____

Steering:
Condition: Play in Wheels_____Hard to Steer_____Damaged_____Repaired_____Good_____

Electrical System:
Battery: Good_____Needs Replacement_____
Starting Motor: Good_____Slow_____Spark_____
Generator: Good_____Sparks_____Needs Brushes_____
Lights: Operative_____Inoperative_____
Wiring: Good_____Frayed_____

Miscellaneous:
Radiator: Good_____Leaks_____Overheats_____
Horn: Operative_____Inoperative_____
Instruments: Operative_____Inoperative_____

Remarks:

Table II. Condition Checklist for Used Lift Trucks

too much may indicate a worn clutch.

The steering column should be checked for play, and if the truck is equipped with power steering, the operation should be checked without a load on the forks—generally the most severe condition.

The truck should, of course, be driven and the condition of the brakes can be determined. Driving it over rough ground will shake off any parts that are loose and indicate serious structural defects. Driving it up a grade to see if the engine maintains power is recommended, and during tryout, the prospective buyer should drive it through each gear ratio to determine the condition of the transmission.

(12) When the truck is being driven, the operator should speed it up and decelerate it abruptly to determine if there is play in the gears. Alternate deceleration and acceleration will cause a "clunk" if the transmission is in poor condition.

(13) The truck should be checked under load to make sure that the lift mechanism works properly and that it will support the rated load. The tilt mechanism should be checked at the same time. Running the truck through the lift and tilt cycle will indicate if the relief valve is kicking out properly at the end of the tilt or lift cycle, and also if there is wear in the valves or packing. A good approach is to make this test on a clean surface or a piece of kraft paper. Oil leakage will show up immediately.

(14) Naturally, operation of the engine should be analyzed by several means. One way is to use a compression gage, which will indicate if there is valve leakage or if the rings are worn or cracked. Putting a vacuum gage on the engine intake manifold will also indicate the condition of the valves. A very simple check can be made by removing the oil "dip stick" and visually inspecting the condition of the oil.

Allowing the truck to idle for 15 to 20 minutes is also a wise precaution. If it overheats, the cooling system may be defective. At the same time, the water in the radiator should be checked for rust and scale. . .the hose should be inspected for cracks. . .all connections should be visually inspected for stains that would indicate leakage.

(15) The speed of the lift is an indication of the condition of the hydraulic system. If the hoist cylinder rises slowly, the pump may be worn. Likewise, if the hydraulic fluid becomes hot, the pump may be in bad condition. Above all, it is wise to make sure that the lift and tilt cylinders are not scored and that the flexible connections in the hydraulic system do not show signs of wear.

(16) The condition of the uprights is important since they support the load. If they are damaged or bent, they may not be capable of supporting the rated load of the machine. This should be determined. So should the condition of the load rollers and side rollers, for excessive side play would indicate replacement. Naturally, all bushings and bearings should be checked, particularly those that act as pivot points on the machine. The condition of the steering spindles can be determined by looking to see if they are worn and still in one piece, or if they are ball or roller bearing types to determine if any balls are missing from the races.

(17) The electrical system—and particularly the generator, battery, and distributor—should be visually inspected. Starting the engine will indicate the condition of the starting motor. If it kicks over fast, the starting motor probably is in good condition; if it turns the engine over slowly, either it may have to be reconditioned or the battery may have to be replaced.

It is an easy matter to take the bank off the generator to determine if the brushes are sparking, just as it is a simple matter to check the wiring for frayed or worn condition. And a visual check of the battery, while not fool-proof, may indicate if a new one is required.

(18) The condition of the truck tires is, of course, important, for tires are expensive. If the sidewalls are badly notched or bruised, new tires may be required. If, on the other hand, the tread is worn thin and the tires have not previously been recapped—this can be determined by looking for separations along the outer rim—recapping may solve the problem. Actually, an industrial truck pneumatic tire can be recapped several times.

Solid cushion tires present another problem. Badly worn units cannot be recapped—they must be replaced—but tread is no indication since there is little tread on a solid cushion tire to begin with. Points to check are the thickness of the tires, the condition of the bond between the rubber and the wheels, and the absence or presence of "chunked-out" sections.

But equally important is the type of tread on the tires and the size of tires with which the truck is fitted. If the truck is to be used indoors, obviously an outdoor rough tread is not desirable. Conversely, if it is to be used outdoors, a smooth indoor tread may or may not perform satisfactorily, depending on the climate.

(19) There are many other points to analyze—the condition of grease fittings. . .condition of instruments . . .the condition of lights, if they are available in the truck. . .and last, but not least, the condition of the horn. This is a small accessory and relatively inexpensive, but it is surprising how many times a horn is inoperative.

Close Check Pays Off

All this sounds complicated. . . but the plain fact is that it sounds more complicated than it is. And any energy that the prospective buyer expends in making sure that he is getting the truck that he wants, in the operating condition that he wants it, is well worth the investment. For a used truck may cost from a few hundred to several thousand dollars, and not only the manufacturer who made the truck but the dealer who is selling it will prefer to have a satisfied to a dissatisfied customer. The checklist may be the difference between the two.

SPRAYING POLYURETHANES

DeVilbiss method is claimed to meet requirements of catalyzed finishes.

By
Harold C. Fornwall*

CATALYZED materials are fast becoming one of the most important types of specialty finishes. It is anticipated that many millions of dollars will be saved annually as the result of eliminating or reducing the number of coats and the curing time for each coat in comparison with regular lacquer or synthetic modification now being used today.

Under appropriate conditions, such coatings have much greater durability and also provide increased resistance to chemicals and corrosion, which are highly desired qualities in those many industries where such exposures are common.

Among the latest interesting developments is the spraying of isocyanate prepolymers, which results in an excellent coating that provides both acoustic and thermal insulation, as well as vapor resistance for exterior and interior surfaces above ambient temperatures. In addition, is the use of the DeVilbiss spray gun for molding and casting operations which has involved resin flow rates up to 400 ounces per minute. This method provides the flexibility of spray equipment for the multiplicity of the molds on the average production line.

It is interesting to note that a new vocabulary consistent with the field is being developed which will become as common-place as the general terms now so familiar to the finish technologist as well as the user. While this entire catalyst development is in its infancy today, it could completely change our present concept of finishing materials and methods tomorrow.

Therefore, it might be well to review the history behind the development of the equipment for the application of catalyst finishes.

Background

From the published information available about three years ago, a multi-purpose investigation was begun.

This paper was presented before the 130th meeting of the American Chemical Society, Division of Paint, Plastics and Printing Ink Chemistry before the symposium on Isocyanate Polymers, Sept. 20, 1956

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As the first phase, many calls were made in the field on paint and basic resin manufacturers as well as product finishes users. The aims were to obtain a complete understanding of the requirements for the use of isocyanate prepolymers and associated catalyzed type finishes. There were, of course, many obstacles to the use of catalyst finishes by the average fabricator of the end product. However, based upon a cross index of the completed case histories the following facts were obtained.

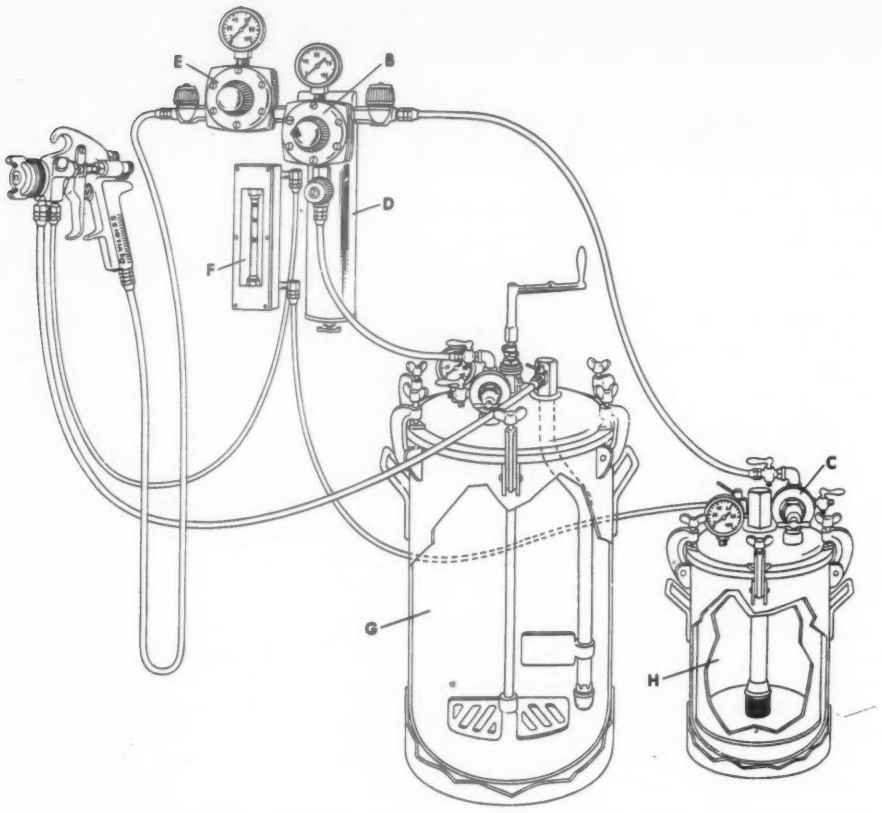
A. Five general classes of catalyzed products were found—
   1. Polyester
   2. Epoxy
   3. Conversion Varnish
   4. Iso-Foams (Rigid Type)
   5. Wash Primers

B. Viscosity characteristics of the above could all be adjusted either by reformulation, addition of solvents or by the use of DeVilbiss paint heater down to 50 seconds in a #4 Ford cup or 250 centipoises at 80° F.

C. The various types of catalyst agents required for the above classification involved organic peroxide, aliphatic polyamines and acid glycol-ether mixtures. All of which are water thin and were used in the ratio range of 2-20% with the required resin.

D. There was the very difficult factor of "Pot-Life". This is the limited practical working time of a pre-mixture of resin and catalyst. Formerly, when pot-life was extended, the advantages of catalyst finishes were greatly impaired.

E. Lack of a mechanical means, of the spray gun type to intermix the two components uniformly, which would allow its application over an extended period. Such a mechanism must give the same end results as though you mixed the two components by hand and spray applied using normal equipment. Failure to achieve



EQUIPMENT FOR CATALYST AND ADDITIVE MATERIALS

Figure 1

The DeVilbiss Catalyst Spray System provides a practical and convenient means of handling these materials which either cannot be premixed or have insufficient pot life to allow application in the conventional spray manner. The heart of this system is the P-JGC spray gun (**A**(. It is built so that two materials are mixed in the spray pattern—after they both have left the gun—and before they reach the surface. This type of instantaneous mixing in atomized form eliminates the handling problems of quick setting and short pot life. The basic material enters the gun near the nozzle and is expelled through the fluid tip in the conventional manner. The catalyst or additive is admitted into the atomizing air through a metering venturi at the side of the head, becomes thoroughly mixed with the air and leaves the gun through the center air jets that atomize the stream of basic material.

The critical ratio of catalyst or additive to the basic material is closely and accurately maintained by multiple regulators and a flow meter (**B, C** and **F**). All components of the system are precision made and specially designed to provide the fine adjustments necessary for the thorough and critical mixing these materials require.

In actual use the system operates much the same as a standard spray outfit. There are no new techniques for the operator to learn—except making the original pressure and flow adjustments. These adjustments, once made, are automatically maintained for the duration of spraying. They can be recorded and re-established for identical performance on future runs.

Both the basic material and the catalyst or additive are fed to the gun from tanks under controlled pressure. Because the flow rate of catalyst is more critical, its supply is controlled by two pressure regulators (**B** and **C**) which eliminate any variation caused by fluctuation in the main line air pressure. The air cleaning and regulating equipment (**D**) is standard. It is connected so that the atomizing air for the spray gun also receives double regulation (**B** and **E**).

A flow meter (**F**) is installed in the catalyst or additive line so that once the desired flow rate is established, it can be continuously checked visually.

The pressure feed tanks (**G** and **H**) used in this system are very similar to standard tanks except for materials used for parts in contact with the fluids. Corrosion resistant metals and coatings are used wherever necessary to insure long service life.

The diagram shows how these various units are connected to make a simple and efficient Catalyst Spray System.

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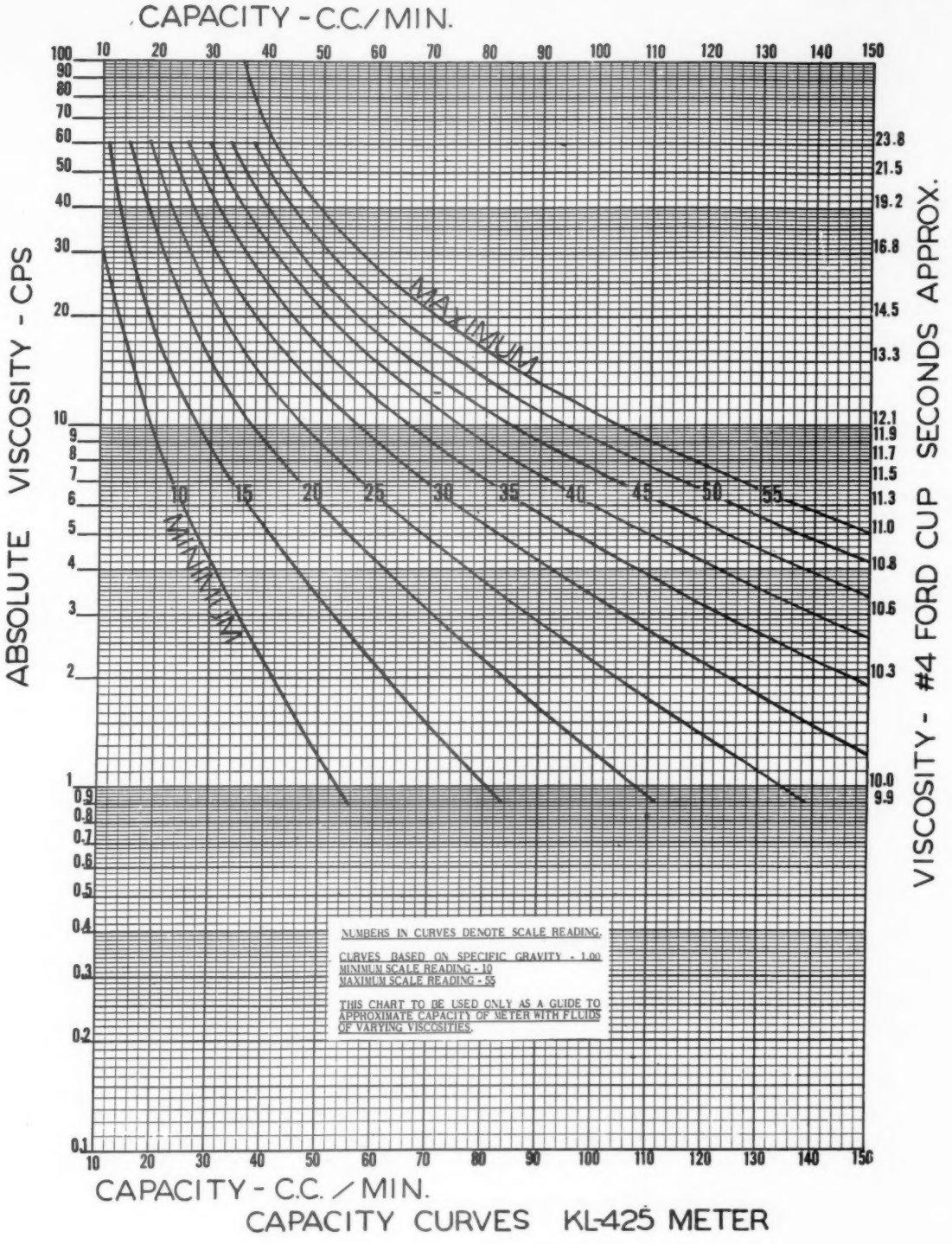
thorough dispersion of the catalyst and resin would result in finishes that cured unevenly, which in turn brought a train of undesirable consequences.

F. The inability to control or change the mixing ratios as production requires.

G. Development of equipment to prevent known reactions that are characteristic of certain materials, having a detrimental effect on the function of the gun.

With sufficient customer interest found, the various requirements for a satisfactory catalyst gun were determined and guns built to meet the needs. They include fluid tips, needles, material passages and connections, built of stainless steel or in the latter two categories, of aluminum with gaskets made of Teflon. A special hard coating has been developed by *The Aluminum Company of America* which has shown remarkable resistance to corrosion on the outside of the gun body due to Iso-Foam application.


CAPACITY - C.C./MIN.
ABSOLUTE VISCOSITY - CPS
VISCOSITY - #4 FORD CUP SECONDS APPROX.
MAXIMUM
MINIMUM
NUMBERS IN CURVES DENOTE SCALE READING.
CURVES BASED ON SPECIFIC GRAVITY - 1.00
MINIMUM SCALE READING - 10
MAXIMUM SCALE READING - 55
THIS CHART TO BE USED ONLY AS A GUIDE TO APPROXIMATE CAPACITY OF METER WITH FLUIDS OF VARYING VISCOSITIES.
CAPACITY - C.C. / MIN.
CAPACITY CURVES KL-425 METER

MAXIMUM CAPACITY OF GUN

AIR CAPS	@60 P.S.I.	@75 P.S.I.	@90 P.S.I.
No. 54	66 c.c.	82.5 c.c.	99 c.c
No. 78	100 c.c	125 c.c.	150 c.c.
No. 704	96 c.c.	120 c.c.	144 c.c.
No. 770	92 c.c.	115 c.c.	138 c.c.

Figure 2. Chart for determining catalyst flow rate.

The liner of the catalyst hose has been formulated to handle the required corrosive catalysts.

A complete line of pressure tanks for catalyst and resins to include aluminum or stainless steel insert containers, also with or without agitators, are now available for production operations.

A series of calibrated flow meters have been designed to handle the various ranges of viscosities and volumes of catalysts required for this work.

The Catalyst Gun

The gun is unique in that only the catalyst is injected into the center air chamber of the gun with a venturi effect. Consequently, no catalyst enters the horn holes of the air cap. It's a little known or published fact that the air that comes out of the center holes in the cap develops the major amount of breakup or atomization, while the air coming out of the horn holes in the air cap develops the fan type spray pattern, so necessary for the practical use of the spray gun on the production line.

As you pull the trigger of the gun, the catalyst mixes with the center air stream internally and this produces the necessary mechanical action for intermixing with the fluid (resin) outside the air cap. A complete trigger pull develops the necessary spray pattern. Inasmuch as the catalyst and resin are intermixed outside the gun, the problem of "Pot-Life" with isocyanate prepolymers is completely eliminated. The gun is always ready for application, and can be used for as short or as long a time as necessary to complete the operation.

The flow of the catalyst through the gun can be checked independently, if so desired. All that is necessary is to release the pressure on the resin tank as shown on the included schematic drawing (Figure 1). This allows functional operation of the catalyst unit only without any disconnections.

In order to obtain the proper spray pattern and the spraying speed required, the first step is to adjust for the correct fluid pressure on the resin tank and the corresponding atomization air at the gun. Then turn the atomization air off and permit the fluid to freely flow into a beaker to determine either by weight or volume, the amount of resin being sprayed.

The Catalyst Meter or Gauge

To set the catalyst flow rate, it is first necessary to obtain the paint or resin manufacturer's recommendation for proper proportioning of catalyst and resin. This may be by weight or by volume. When the proper volume of a catalyst is determined, this information may be translated into a scale reading, on the meter according to a chart (Figure 2) we have developed which shows the flow in C.C. per minute at any given float reading, depending upon the viscosity of the catalyst.

For example, if you find that you are flowing 700 C.C. of resin per minute, and it required 5% catalyst or 35 C.C. of catalyst per minute, adjust the pressure on the catalyst tank so that the ball in the flow meter will float at 19 (if the viscosity of the catalyst is 12 seconds).

A flow meter incorporated in the catalyst line for the first time gives the operator a visual means of checking the flow of catalyst, thereby, eliminating the previous danger of not being able to maintain the correct amount of catalyst as determined by actual test.

This meter is a precision instrument built specifically to secure accurate, repeatable flow measurements of the principal types of catalysts, falling in any one of the following groups:

1. Organic Peroxide Catalysts
2. Aliphatic Polyamines
3. Sulphuric Acid Glycolether Mixtures

The pressure on the catalyst container is adjusted until the float reaches the proper scale reading while spraying. In this manner, the operator will know that he is spraying catalyst at the proper rate, as predetermined.

The Spraying of Catalysts

The key to the satisfactory use of the aforementioned five types of catalyzed spray formulations centers on their viscosity. It has been found that if the resins can be reduced in viscosity (below 60 seconds #4 Ford cup or 300 Centipoises @ 80° F.) a satisfactory finish coating can be applied. This may be accomplished either by reformulation, the addition of necessary solvents, or by using a DeVilbiss paint heater. A deviation from this generalization has been found in the application of semi and resilient type isocyanate prepolymers. Inasmuch as these products develop satisfactory characteristics when spray applied at considerable higher viscosities, even when heated to 180° F. The reasoning has been expressed that their is a migration action between the additive and the prepolymer until the reaction is complete.

To date, the successful coatings incorporate catalysts having a viscosity range of 10-15 seconds #4 Ford cup. The practical working ratio of catalyst to resin has been from 2-20% (by volume). The above covers the intermixing range of resins and additives.

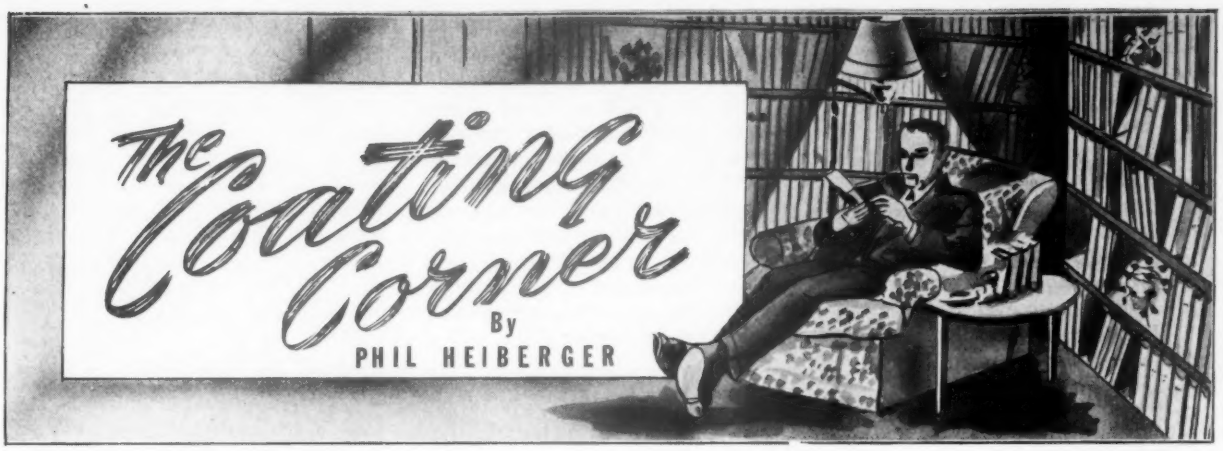
Isocyanate prepolymers present a most interesting field. A controlled rigid foam of from 1/8 inch in thickness up to a plus 2 inches, has been successfully sprayed. In order to provide industry with greater spraying speed in the semi and resilient iso-foam field, we have developed a round spray cap #129 which makes use of an 9/32 fluid tip. Field tests indicate 400 ounces per minute can be applied for molding or casting operations. This new combination provides a faster foaming reaction with less overspray. Considerable laboratory reformulation work is underway in an effort to reduce the high initial viscosity of this type of resin.

In general the following table of viscosities both at room temperature and elevated, are average for their respective types:

1. Rigid—10,000 C.P.S. at R.T.—250/300 C.P.S. at 180° F. (82.2° C.)
2. Semi—10 to 20,000 C.P.S. at R.T.—300/700 C.P.S. at 180° F. (82.2° C.)
3. Resilient—20,000 C.P.S. at R.T.—1000 C.P.S. at 180° F. (82.2° C.)

Both the semi and resilient type of foam are sprayable, using a developed positive displacement pumping arrangement. This is necessary due to their

(Turn to page 109)



The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

Insatiable Monster

TELEVISION has been called an insatiable monster because, with its mass audiences, it gobbles up in a few weeks an amount of script material the legitimate theatre and the vaudeville stage would normally take years to consume. Therefore the need for creative writers is great and opportunities are many.

In the scientific field we have our own peculiar brand of insatiable monster—the development laboratories. I quote from an editorial in the October 1956 issue of *Research and Engineering*.

"Applied research in this country is proceeding at such a pace that men in charge of developing new products and processes are severely concerned with the rate at which we are using up our stockpile of basic research data. Providing a steady source of inflow into this stockpile to meet the needs of applied research and development is now a serious problem; more and more the time of research and development teams is being spent in the investigation of a fundamental type before applied work can proceed."

Research is slow and the yield is low. Development, on the contrary, is faster and the yield is comparatively high. This may explain why, in the area of organic

Phil Heiberger

coatings, although we are flooding the market with numerous new and improved raw materials, processes, and formulations, most of our more commonly used products have their origin in research conducted more than 10 years ago. Aside from radiation induced polymerizations, there is little basically new in coating materials for widespread exploitation.

I am thinking of something fundamentally different with the potential of alkyds, epoxys, polyurethanes, silicones, or ureas, to mention a few former research curiosities. Of course, no individual can speak with authority on such a subject, but many, I know, share this hunch.

A Coming of Age

AS an industry, specialty, or profession grows, so grows its literature.

Atomic energy is a case in point. At first developments in the utilization of nuclear energy were published in established chemical and physical journals—*Journal of Applied Physics*, *Analytical Chemistry*, etc. Then, as the body of atomic knowledge increased in size and as the pace quickened, one by one magazines devoted exclusively to atomic energy made their appearance—*Nucleonics*, for example.

The latest in this procession, a multi-language international magazine, is especially noteworthy. It is published in four languages. More specifically, each article is printed in the chosen language of its author—either English, French, German, or Russian—but, as an accomodation for all its readers, the resume preceding each article is printed in all four languages. Readers not versed, then, in the language of any particular article can tell at a glance from the resume whether they wish to have the complete piece translated.

The International Journal of Applied Radiation and Isotopes is published in England by the Pergamon Press Ltd., London.

An article entitled, "Gamma-

ray Vulcanization of Rubber," by S. D. Gehman and I. Auerbach, from the first issue of this international journal should be of interest.

I quote two passages from the body of the article.

"Vulcanization is the industrial process which transforms rubber from a soft, sticky, readily moulded plastic to the highly elastic material familiar to everyone."

"Polymer science teaches that the essential or general feature of all vulcanizing reactions is that they bring about a cross linking or interconnection of the long, flexible rubber molecules into a network structure."

This, of course, can be the description of the many curing reactions occurring with surface coatings. Therefore this article portends work which may soon affect us more intimately.

Particularly pertinent is the authors' abstract, which follows:

"An experimental study was made of the vulcanization of rubber by the cross-linking action of intense gamma radiation from a Co^{60} source. Vulcanization by heat and chemicals is an important, highly developed industrial process, the essential feature of which is the chemical cross-linking of the rubber molecules by sulphur atoms. With gamma-ray vulcanization, the cross-linking occurs by the elimination of hydrogen and the formation of carbon-carbon bonds, which are more stable than sulphur bonds. The usual vulcanizing agents and sulphur were found to have only slight influence on gamma-ray vulcanization, but fillers enhanced the effects of the radiation, probably through scattering or other interaction with the photons. The tensile strengths developed with a series of fillers were found to increase with the specific volumes of the fillers. Tensile strengths obtained with gamma-ray vulcanization were not as high as can be secured by conventional vulcanization. The radiation dose required for vulcanization was relatively large, 1 to 5 X 10^7 rep. If there were no heat losses, such a dose would raise the temperature of the rubber to ordinary vulcanizing temperatures. Typical potential advantages of gamma-ray vulcanization include uniform vulcanization of thick articles, more stable, better ageing vulcanizates, cold vulcanization of extruded shapes or preforms, and faster preliminary processing of the rubber stock. The development of industrial applications of gamma-ray vulcanization may be contingent on the economical utilization of fission-waste products or spent reactor-fuel elements and developments in the technology of working with intense radiations."

Grass Not Greener

WE all tend to indulge occasionally in the fantasy that the grass is greener on the other side of the fence. Here's an item from the other side of the Atlantic to dispel once and for all that popular misconception, at least in regard to helpful and informative evaluation of new products. It tells about an exception that proves the rule.

Reviewer A.J.F. reports in the J.O.C.C.A. *39*, 954 (1956) on a meeting of the Hull Section, Oil and Colour Chemists Association. The lecture was so good that A.J.F. remarked, "This type of lecture could very easily degenerate into a sales plug, and few things can be more annoying than to go to an OCCA meeting and be presented with a review of the mixture of half-truths and blind optimism which some manufacturers circulate as information."

Frequently my sentiments exactly.

Handwriting On the Wall

IN this wide-screen era some of us are still thinking in narrow-screen terms. Every so often, however, something jolts us out of our old thought patterns.

We're so accustomed, for example, to regarding ourselves as competitors of others in the same business that an occasional item like the following from a recent issue of the *Wall Street Journal* can perform a useful function. Actually, as some folks see it, our strongest potential competitors may not be in the paint business at all!

To wit: "When the 1958 World's Fair opens in Brussels next year, the United States exhibit will be housed in an aluminum and plastic building which will use about 40,000 square feet of glazed plastics. Conversations now are under way between Government officials and plastic companies concerning materials for the structure."

Before you conjure up dreary mental motion pictures of PAINT being kicked, bag and baggage, out of the house and into the cold, friendless street, and before you decide that the view from this column is too pessimistic for your delicate taste, a word of caution: He who hesitates is lost.

So, I pray you, check those alligator tears and read on for a little bit.

Sunny Side of the Street

IN point of fact, the street is an excellent place for paint to be. Millions of gallons land happily in the street each year in the form of traffic paint. We are referring to those miles and miles of solid and broken white and yellow center lines along our myriad highways and main roads. Paint, at your service, sir.

Those lines alone account for an amazingly high percentage of our annual paint gallonage. With the steady increase in motor vehicles, new highway construction, and road improvement, a corresponding increase in the annual use of traffic paint can be confidently expected.

But an even happier prospect is sliding our way. It's in the form of a possible protective coating for motorists (sic)—a chemical road surface coating that prevents skidding. It also inhibits road deterioration where traffic is heavy.

Preliminary tests indicate the coating, a mixture of epoxy resins and tiny stones, has "great promise for use in critical areas," such as toll booth entrances where cars must continually stop and start, according to a report at the recent annual meeting in Washington of the *Highway Research Bureau.*

Epoxy resins are notable because of their hardness, flexibility, and resistance to chemicals for this application.

Just imagine the number of gallons of protective coating it would take to paint all the dangerous curves (slippery when wet) in the U.S.A., to say nothing of those abroad.

So you see? There's frequently something new under the sun and always a variety of ways to skin a cat.

NEWS

E. S. Pattison

Pattison Calls for More Glycerine Experiments

E. Scott Pattison, Manager of the Glycerine Producers Association, called for the industry to increase experimentation to develop new uses of glycerine to offset a drop in the industry's ratio to the general production index.

Mr. Pattison spoke before the Glycerine Division at the Soap and Glycerine Producers Convention at the Waldorf-Astoria Hotel, New York City, January 24th.

He said that glycerine producers have held their place poundwise, "but probably not percentagewise, with the development of the more specialized polyols and modifications of alkyd formulations."

He pointed out that while glycerine holds its place as a humectant and plasticizer in cellophane and tobacco, and has made good gains in emulsifiers and food additives, its use in explosives and toilet goods has suffered through the introduction of new and specialized ingredients.

In the search for new uses of glycerine, Mr. Pattison cited the possibilities in the field of personal consumption. He said, "there is certainly something significant to the fact that the safety and compatibility and acceptability of glycerine on, in and about the body, is the one area where the challenge of other chemicals is easily and completely met."

Mr. Pattison noted the continued importation of crude glycerine into the United States in a period of rising stocks and free availability. He said that the production of domestic glycerine hit a new high in 1956, 246 million pounds compared to the previous high of 228 million in 1955.

Imports, he said, are expected to total 16.8 million pounds on a 100% basis. Exports of refined glycerines may reach 10 million pounds and tend to balance the overall picture, but the pressure to dispose of foreign supplies of crude glycerine in the U. S. market has been strong.

As an explanation for the increased availability of foreign crude glycerine, Mr. Pattison offered the rise of soap output in less highly industrialized countries, where the standard of living is now rising. New soap plants, he said, are being built to permit efficient glycerine recovery.

He cited Indonesia, which has become a major seller of crude glycerine, as an example.

But, he pointed out, low cost foreign glycerines appear to be a rather transitory resource under present world conditions. America's synthetic production, therefore, is a more steady source for glycerine users.

Mr. Pattison warned against the deception in the high stock levels being taken as distress signals by the writers of chemical market columns. He said that previous peak levels should not be turned to for precedent, because "we have been using more glycerine and a stock level is only large or small in relationship to the days of normal demand which lie ahead."

NEW ENGLISH PLANT: National Adhesives, Ltd., English affiliate of National Starch Products, is erecting a polymerization plant in Slough, England, which is expected to begin operation in March, 1957. Left to right, G. A. Mobbs, Director of Slough Estates, Ronald M. L. Francis and Arthur R. G. Williams of National Adhesives, and C. W. Fairall, Director of Slough Estates, inspect the new structure.

Paint Course at Purdue

A short course in Paint and Varnish Technology will be offered by the School of Chemical and Metallurgical Engineering at Purdue University from June 24-28.

Main topics to be covered will be Processing Steps in the Manufacture of Finishes and Resins; New Technical Developments in Resins, Oils, Solvents, Pigments, Driers, Testing Methods and Customer Specifications; and The Protective Coatings Industry.

Lyle F. Albright, associate professor of chemical engineering at Purdue, has announced that one of the guest speakers at the course will be Dr. James S. Long, of the Speed Scientific School at the University of Louisville.

Miniature Paint Tester

A "do-it-yourself" demonstrator to show the blister resistance of house paints has been devised by Archer-Daniels-Midland.

It is a "blister glass," a miniature paint tester, said to provide a small scale illustration of results obtained in actual field tests on 15 houses in the Twin Cities area.

The apparatus consists of a drinking glass, a wooden disc and a piece of plastic tape. The disc is painted with two coats of paint, and about an inch of water is poured into the glass. The disc is fitted into the top of the glass, paint side up, and is taped around the edges.

The glass is then placed on a radiator or other mild heat.

NEWS

Amoco Chemicals Corp. To Research Paints

The newly organized Amoco Chemicals Corp. will invest heavily in research aimed at creating new products for the paint, rubber, plastic and chemical industries, according to its president, Jay H. Forrester.

Amoco Chemicals was formed by consolidation of Pan American Chemicals Corp., a subsidiary of the American Oil Co.; Indoil Chemical Co., subsidiary of Standard Oil Co. (Indiana); and the former Hidalgo Chemical Co., a Stanolind Oil and Gas Co. subsidiary.

Amoco Chemicals' Brownsville, Texas, plant produces aliphatic chemicals such as ethyl alcohol, acetaldehyde, and butyl alcohol. The company's Texas City plant turns out aromatic hydrocarbons for making resins, plasticizers and insecticide oils.

The first major development project of the new organization will be the construction of a plant in the Midwest for a new hydrocarbon oxidation process to produce aromatic acids from petroleum raw materials.

Main headquarters and the general sales office of Amoco Chemicals will be at 910 S. Michigan Ave., Chicago, Ill. An eastern sales office in the Amoco Building in New York will serve as an Amoco Chemicals office. Sales representatives are also based in Boston and Akron, Ohio.

Mr. Forrester said the new organization's marketing will be extended under the new setup. The corporation also plans to broaden its foreign markets.

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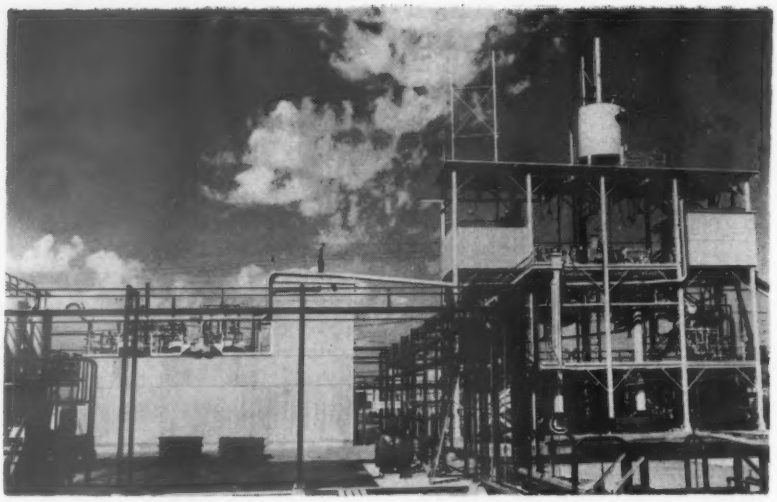
Mantrose Appoints Agents

The Mantrose Corp., importers, bleachers and manufacturers of shellac, Brooklyn, N. Y., has announced the appointment as sales agents of Cuyahoga Chemical Co., Cleveland, Ivan T. Bauman Co., St. Louis, Charles A. Little, Jr., Atlanta, and Palmer Supplies Co., Cincinnati.



STYRENE-BUTADIENE LATEX PAINT: The Dow Chemical Company Western Division put this plant for the commercial production of styrene-butadiene latexes into operation late in 1956 at Pittsburgh, Calif. The plant is the fourth Dow latex supply point, and services the West Coast markets. The plant cost more than $1,000,000, according to R. L. Curtiss, vice president and general manager of Dow's Western Division.

Packaging Conference Scheduled for Chicago

The 26th Annual National Packaging Conference of the American Management Assoc. will emphasize the need for coordinated research, design and development to produce the maximum protection at the lowest possible cost.

The Conference will be held at the Palmer House, Chicago, April 8-10, and will run together with the Association's 26th Annual National Packaging Exposition scheduled for Chicago's International Amphitheatre, April 8-11.

More than 1,000 specialists in packaging, shipping, traffic management, materials handling and merchandising are expected to attend the Conference, while some 30,000 executives are to see the Exposition of more than 375 exhibits.

A. C. Nielsen, Jr., executive vice president of A. C. Nielsen Co., will open the Conference with an analysis of packaging's dominant position in today's consumer market.

Conference sessions will be held only on the mornings of April 8, 9 and 10, enabling registrants to also attend the exhibition.

The industrial side of packaging will be covered by five representatives of the Bendix Aviation Corp. They will form a panel to describe the organization and operation of their packaging setup.

The Department of Agriculture's Forest Products Laboratories will have a six-man panel take up package design and testing procedures for pallets, wooden boxes and crates, and fibre and corrugated cases on April 10.

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Houston Firm Expands

Coast paint and Lacquer Co. of Houston, Texas, will double its production potential as the result of a $200,000 building and expansion program.

A two-story, 10,000 square foot paint manufacturing building is already under construction, according to Kenneth McDowell, president.

The new building will enable the firm to produce two additional lines, McDowell said. They are Copon Zincguard, an inorganic metallic zinc coating for corrosion control, and a series of corrosion control coatings for pipelines, offshore and marine needs, and for the chemical industry.

The expansion program calls for a 25 percent production increase upon completion of the new building, with an expected increase of 120 percent within five years.

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Chemical Plant Relocates

Chemical Paint Products Corp. has moved to a new plant at 192 Green St., Brooklyn, N. Y., according to its president, Daniel Levine.

The firm was previously at 245 Plymouth St. in Brooklyn.

NEWS

Dr. J. S. Long to Speak at Southern Convention

The 21st Annual Convention of the Southern Paint and Varnish Production Club will feature an address by Dr. J. S. Long. The Convention will be held April 10-13 at the Hotel Sorena, St. Petersburg, Fla.

Also on the agenda are a report on the Paint Technology course at the University of Florida by Dr. Henry F. Payne, and a symposium on Plant Safety featuring Mr. Henry A. Johnson of Celanese Corp. of America, and Mr. C. E. Cain of Hercules Powder Co.

A round table discussion on "Exterior House Paints" with Ray C. Adams as moderator, and an Open Forum conducted by William E. Hood will also be held.

The ladies at the convention will be entertained at a get-acquainted luncheon on April 11 at the Tides Hotel and Beach Club, followed by a fashion show featuring creations for spring and summer.

Mrs. P. W. Layman and Mrs. M. J. Catena are co-chairwomen for the Ladies Hospitality Committee.

The Southern Club officers and Advisory Committee will entertain the visiting Federation officers and the National Association officers at luncheon on April 12. The banquet for ladies and gentlemen will be held that evening, followed by an informal dance.

The Machinery and Raw Materil Exhibit is sold out with 40 exhibitors utilizing 55 booth spaces, according to R. B. McGoogan. The Exhibit will be open on April 10.

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SUCO Announces Move

The Standard Ultramarine & Color Co. has announced the movement of its eastern sales offices to the National Newark Building, Room 1903, 744 Broad St., Newark 2, N. J.

The firm's eastern representatives, W. A. Koenig and J. S. Booth, were formerly located at 60 East 42nd St., New York, N. Y.

PAINT SHORT COURSE: Registrants at the short course in Paint Technology watch a demonstration of the Cowles Dissolver and the Kady Mill by Professor Payne in the Organic Coatings Laboratory of the University of Florida. A booklet containing papers presented by speakers has been prepared, and is available for $3.00 from Professor H. F. Payne, Chemical Engineering Department, University of Florida, Gainesville, Fla.

DuPont to Build Third Titanium Dioxide Plant

Du Pont will build a third titanium dioxide plant, to begin operation early in 1959 on a 1500-acre site near New Johnsonville, Tenn., the company announced.

The plant is expected to have a capacity of 125 tons of the white pigment a day. It will employ a new process for producing the pigment, and will initially employ an operating force of 400.

Du Pont's Pigments Department operates two other titanium dioxide plants at Baltimore, Md., and Edge Moor, Del.

The new plant, to be called the Johnsonville Plant, will be located on the east bank of the Tennessee River, about two miles south of New Johnsonville. It will employ the recently developed chloride process for making the white pigment.

Announcement of construction plans for the new plant came a week after the Pigments Department said it would build the world's first full-scale plant for manufacturing hyper-pure silicon. The silicon plant will be built near Brevard, N. C.

Ilmenite, a black sand high in titanium content, will be used as raw material at the Johnsonville Plant. It will be shipped by rail from du Pont's ilmenite mines at Starke and Lawtey, Fla.

Meeting Chairmen Named

P. J. Whiteway, Jr., of G. D. Wetherill Varnish Co., Camden, N. J., has been named chairman of the Host Committee for the 35th Annual Meeting of the Federation of Paint and Varnish Production Clubs at the Bellevue-Stratford Hotel in Philadelphia, October 30-November 2.

P. J. Whiteway

E. H. Ott

Official announcements of the Annual Meeting and hotel reservation forms are to be distributed soon, according to Eugene H. Ott, of Ferbert-Schorndorfer Co., Cleveland, chairman of the Federations Meeting Committee.

Assisting Mr. Whiteway will be Host Subcommittee chairmen Robert Toothill, G. D. Wetherill Varnish Co., and Walter Bayer, Sinclair Refining Co., Registration; Bob Cox, Gilbert Spruance Co., Operations; John Williams, Calbar Paint & Varnish Co., Banquet; Harold Gough, Finnaren & Haley, Inc., Entertainment and Dance, and Mrs. Gough, Ladies' Entertainment.

NEWS

Southern Paint Group Hears Dr. C. A. Knauss

A talk by Dr. C. A. Knauss on "The Alkyd Tree" highlighted the January 17 meeting of the Atlanta Section of the Southern Paint and Varnish Production Club at the Dinkler Plaza Hotel.

Dr. Knauss is Vice-President in charge of the Surface Coating Resins Division of Reichold Chemicals. His talk described alkyds in general, and discussed the uses and properties of each of the different types.

Parker W. Layman, President of the Southern Club, reported that all exhibit space has been sold for the Southern Club Convention to be held at the Hotel Sorena, St. Petersburg, Fla., April 10-13. He said that all rooms at the Sorena have been reserved and nearby hotels will now be used.

The meeting was told by Mike Catena, chairman of the Southern Club education committee, that more than 50 students were enrolled in the Club-sponsored Paint Short Course at the University of Florida.

The meeting of more than 80 members was presided over by Chairman W. S. Herner.

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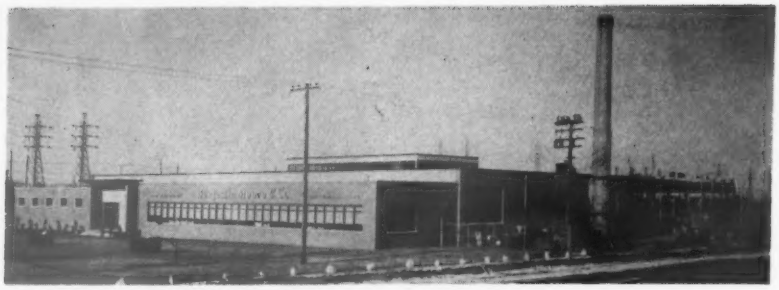
DuPont Auto Paint Film

A 13-minute color motion picture on the testing and application of DUCO Lacquer High Speed Primer Surfacer produced by du Pont has been filmed for the company by Transfilm.

Titled "Build For Profit," the film will be shown to du Pont jobber salesmen and automobile refinishers throughout the country.

Opening scenes were filmed at the company's Marshall Laboratory in Philadelphia, where the research behind the new paint undercoat is outlined. A substantial portion of the film is devoted to an actual fender repair job demonstrating the characteristics of the high speed primer surfacer.

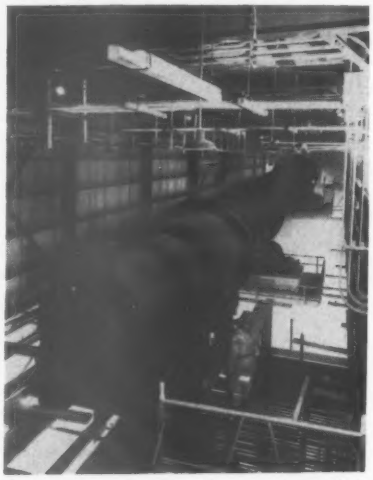
Jack Rode, chemist, and Carl Herberger, salesman, both of duPont, appear in the film.



ADD TO MONTREAL PLANT: An addition to the Montreal plant of Benjamin Moore & Co., pictured above, is expecte to ddouble its paint production capacity. Opening of the addition is scheduled for April, according to B. M. Belcher, president of the company.

National Lead Completing Titanium Pigment Plant

Canada's first titanium pigment plant has been nearly half completed, according to an announcement by National Lead Co.



Huge rotary kiln being installed in new plant of Canadian Titanium Pigments, Ltd., at Varennes, Quebec.

The plant is being built at Varennes, Quebec, by Canadian Titanium Pigments, Ltd., a National Lead subsidiary. Production is scheduled to begin in the third quarter of this year.

The plant's entire output of titanium dioxide will go to Canadian industry.

The new $15 million plant is about 15 miles northeast of Montreal, on a 76-acre tract. It will employ approximately 300 workers. The site was selected because of its proximity to titanium ore, railroad and highway facilities, and power and water supplies.

Ore will come in slag form from the Quebec Iron and Titanium Co. in Sorel, Quebec, approximately 40 miles down the St. Lawrence River from the plant site.

More than half of the exteriors of the buildings have already been erected, according to company officials, and the majority of the structural steel has been put up. The water supply system and steam boilers are in place and major equipment has been installed.

A railroad spur has also been built.

Catalin Realigns Divisions

The formation of a new chemical division of Catalin Corporation of America and the realignment of thermosetting and thermoplastic sales on a divisional basis have been announced by Harry Krehbiel, president.

Antioxidants will be among the first products to be marketed by the new division.

Paul A. Krentel has been named to head the new Chemical Division. Edward W. Bastian, sales vice president, directs the Thermosetting Division, while Frank E. Hadley became vice president in charge of the Thermoplastic Division.

Borden's Transfers Labs

The Monomer-Polymer Laboratories of the Borden Company's Chemical Division have been transferred to 5000 Langdon St., Philadelphia, Pa., from Leominster, Mass.

The firm's Dajac Laboratories for custom organic syntheses were also moved, the company announced.

New facilities for the Monomer-Polymer Laboratories include research, development and production units for the custom preparation of specialty monomers and polymers.

Both laboratories are under the direction of Dr. K. C. Tsou.

The outside (and inside) story

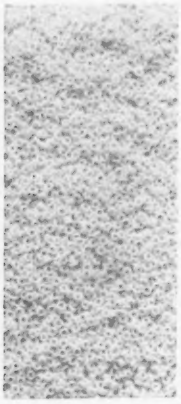
about Monsanto Lytron 680...*
a chemically unique Acrylic-type Polymer Latex...
for both Exterior and Interior Latex Paints

MONSANTO

*LYTRON: REG. U. S. PAT. OFF.

12 reasons why

Lytron 680, a new acrylic-type polymer latex,



is a synthesis of monomers well balanced to form a smooth, flexible film . . . even at temperatures less than 40°F. (5°C.) without modification. Films cast from LYTRON 680 are water resistant in thirty minutes, exceptionally durable and resistant to oxidation on weathering.

Problems experienced with many other latex binders are eliminated. LYTRON 680 films do not rupture on porous substrate and there's no color mottling or spotting. Blistering, even over green masonry, is minimized.

Controlled small particle size insures the proper binding of high volumes of pigment to form paint films with excellent adhesion, color retention and resistance to substrate alkalinity without sacrificing stability. In addition, paints made with LYTRON 680 are easily formulated and produced with standard procedures on existing equipment.

And, in over two years of exposure tests in 14 representative climatic regions of the United States, paints made with LYTRON 680 have proven themselves without exception.

NOTE: Although LYTRON 680 was developed by Monsanto as a binder for exterior latex paint, features have been incorporated which make LYTRON 680 equally useful, either as a sole vehicle, or as a modifier for other alkaline latex vehicles, in high quality Interior Paints.

Lytron*680 is best

for both exterior and interior latex paints

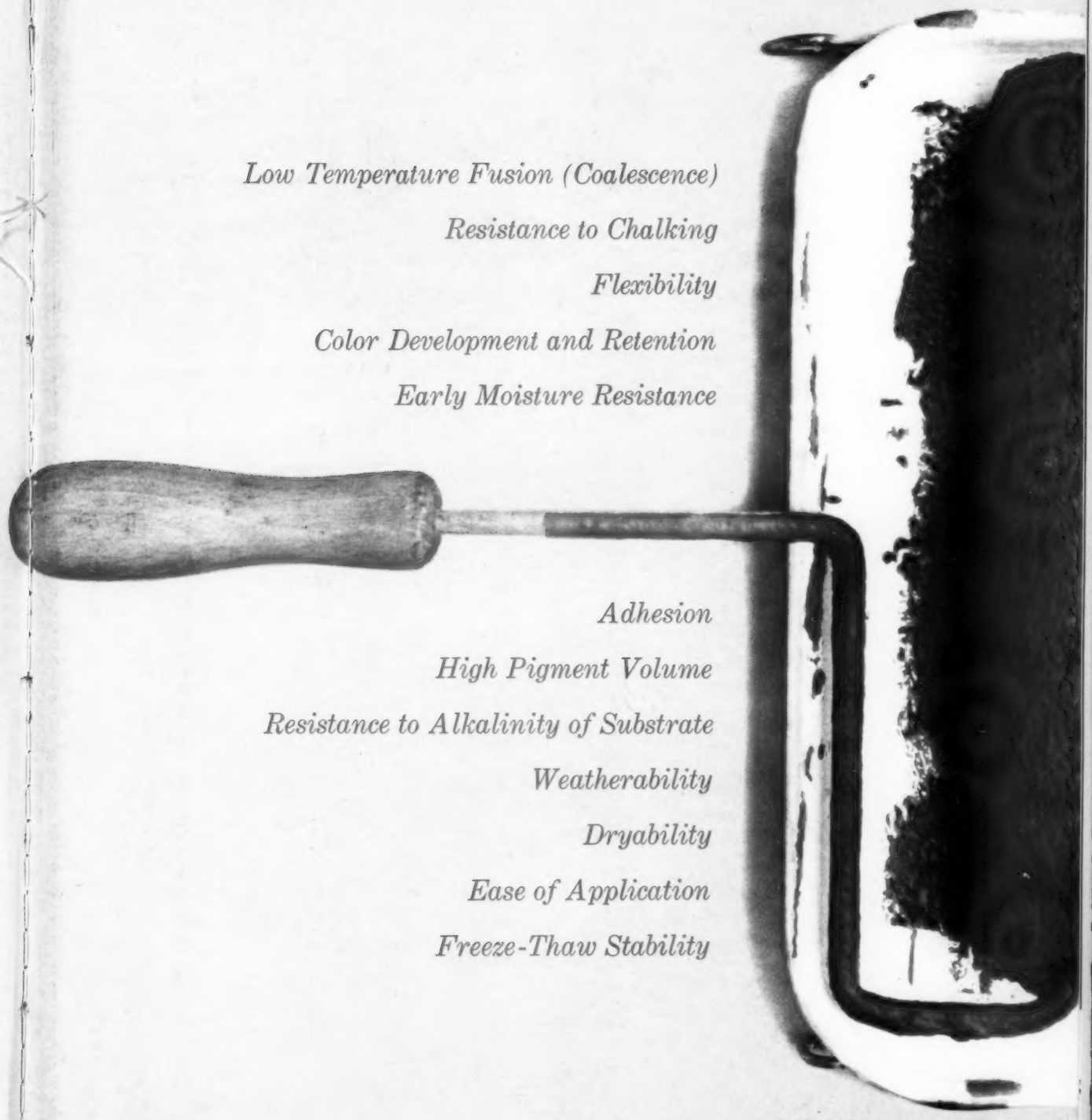
Low Temperature Fusion (Coalescence)

Resistance to Chalking

Flexibility

Color Development and Retention

Early Moisture Resistance



Adhesion

High Pigment Volume

Resistance to Alkalinity of Substrate

Weatherability

Dryability

Ease of Application

Freeze-Thaw Stability

Lytron* 680 *now on stream...*

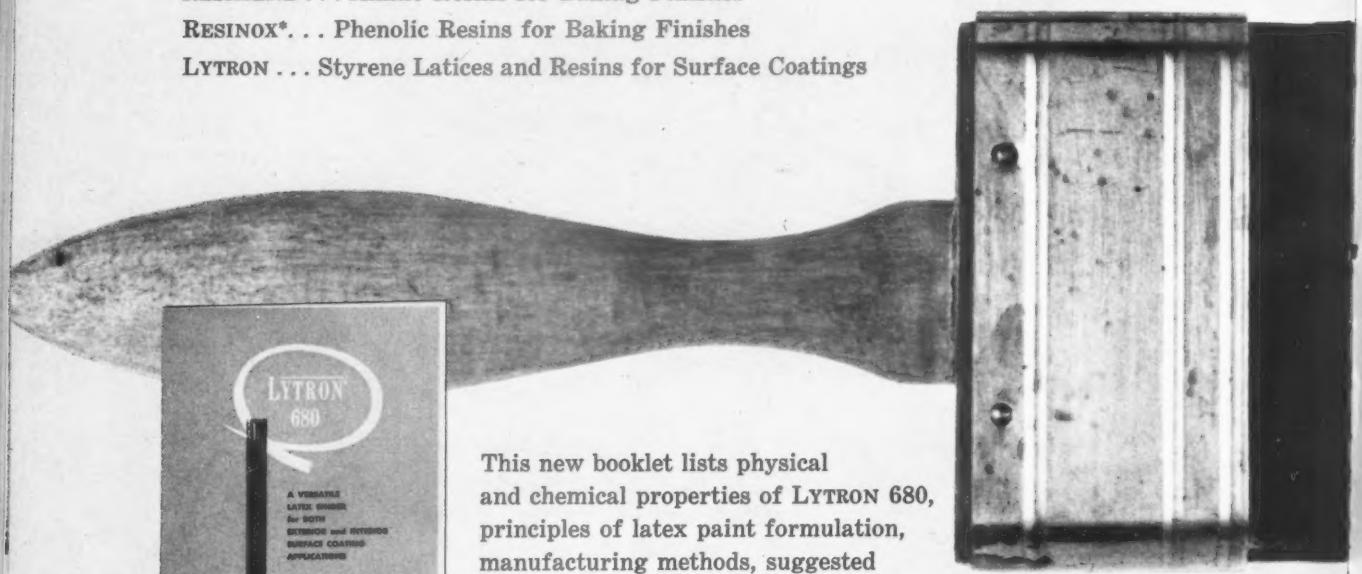
LYTRON 680, now in full commercial production and being utilized by some of the nation's largest paint producers, is available for immediate shipment in tankcar quantities. Use coupon below to order evaluation samples, price schedules, and technical booklet. Monsanto Chemical Company, Plastics Division, Surface Coating Resins Dept., Springfield 2, Mass.

Other Monsanto Products for the surface coating industry:

RESIMENE*. . . Amino Resins for Baking Finishes

RESINOX*. . . Phenolic Resins for Baking Finishes

LYTRON . . . Styrene Latices and Resins for Surface Coatings



This new booklet lists physical and chemical properties of LYTRON 680, principles of latex paint formulation, manufacturing methods, suggested formulas for interior, industrial, and exterior paints, test methods, etc.

*LYTRON, RESIMENE, RESINOX: REG. U. S. PAT. OFF.

MONSANTO CHEMICAL COMPANY, Plastics Division, Surface Coating Dept. 379, Springfield 2, Mass.

Please send me further technical information on LYTRON 680. ( )

My name_____ Title_____

Company_____

Address_____

City_____ State_____

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It's new—

ELVACET® 84-1100

POLYVINYL ACETATE

A high-quality polyvinyl acetate emulsion with outstanding water resistance . . . uniformity . . . mechanical stability . . . and compounding characteristics.

. . . the all-purpose vehicle for water-base paints

PROPERTIES OF "ELVACET" 84-1100

Solids	54%-56%
Viscosity	9-13 poises
Vinyl Acetate Content	1.0% maximum
pH	4-6
Water Resistance	Excellent
Density	9.2 lb./gallon
Mechanical Stability	Good
Compounding Characteristics	Good
Particle Size	1-3 microns

Now . . . available in commercial quantities, "Elvacet" 84-1100 contains the properties you need to make top-quality exterior masonry paints and interior finishes. "Elvacet" 84-1100 is the product of extensive Du Pont research and field experience . . . more than 21 months of actual exposure testing.

This latest development combines excellent water resistance with the outstanding stability and compounding properties of other "Elvacet" emulsions. In addition, coalescing properties and resistance to water spotting have been improved. To find out more about new "Elvacet" 84-1100, contact our nearest district office or send the coupon below.

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Electrochemicals Department, Wilmington 98, Del.

☐ Please send me more information on "Elvacet" 84-1100 for paints.
☐ Please have your representative call.

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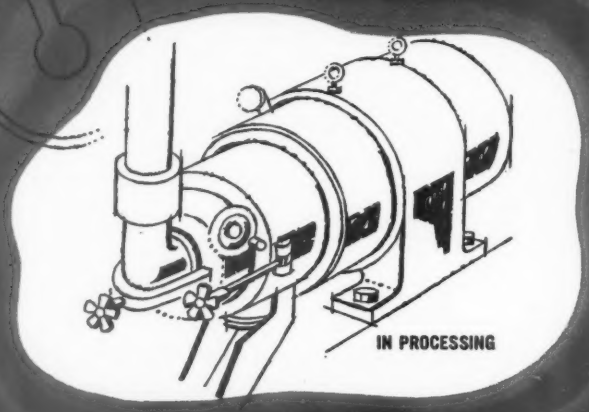
THOSE LITTLE BOTTLES THAT BUILT THE PLANT

NEW

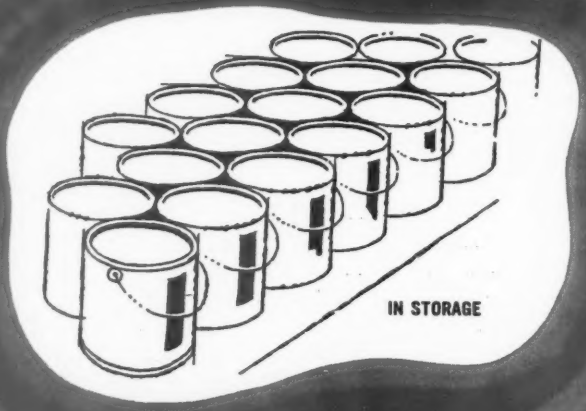
heat-stable bodying agents

NUVIS® HS and NUVIS HSD

The bodying requirements of most coating systems are now met by a new heat-stable agent, available in both paste and powder form. Nuvis HS and Nuvis HSD develop and maintain thixotropic body, prevent sagging and settling *without side effects*. High processing temperatures, or high temperatures sometimes encountered in storage, will not cause them to seed.



Your gloss, semi-gloss, alkyd flat enamels—among other paints and vehicles—are now served by *one* Nuodex Additive, in either convenient form.



Send for samples and data sheets on Nuvis HS and HSD. Write us direct today, or call upon your Nuodex Representative.

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NUODEX ADDITIVES AND S/P CHEMICALS

TO HELP MAKE GOOD PAINTS BETTER

DRIERS—FUNGICIDES—MIXING AND MILLING AIDS—ANTI-SKINNING AGENTS—LOSS OF DRY INHIBITORS—BODYING AGENTS

NEWS

ACS Paint Division Announces Miami Program

The American Chemical Society's Division of Paint, Plastics and Printing Ink Chemistry has announced its schedule of events for the ACS 131st National Meeting in Miami.

The Meeting will take place April 8-11. All symposiums will be held in the Flagler Room of the McAllister Hotel, except the Naval Stores Symposium on Tuesday, April 9, which is scheduled for the Pan American Room of the Columbus Hotel.

The schedule follows:

MONDAY, APRIL 8

General

9:30 A.M. J. Kenneth Craver, division chairman. *Introductory Remarks.*

9:35 R. E. Gulick, W. H. McKnight and J. M. Austin. *Improved Pigment Dispersions for Vinyl Finishes with the Metal Organic Surfactants.*

9:55 E. T. Severs and Gretchen Smithmans. *Clear Points of Dilute Plastisols.*

10:15 J. B. deCoste, J. B. Howard and V. T. Wallder. *Weathering of Poly(Vinyl Chloride)-Effect of Composition.*

10:35 John Wynstra. *Some Correlations Between Mechanical Properties and Structure of Epoxy Resin Castings.*

10:55 Charles T. Patrick, Jr., Charles W. McGary, Jr., and Benjamin Phillips. *Resin Forming Reactions of Cyclohexene Oxide Derivatives. Part I.*

11:15 Charles W. McGary, Jr., Charles T. Patrick, Jr., and Benjamin Phillips. *Resin Forming Reactions of Cyclohexene Oxide Derivatives. Part II.*

11:35 E. V. Kirkland, Robert F. Smith and Robert J. Lee. *Esters of Trimestic, Trimellitic, Uvitic and Mesitylenic Acids.*

Properties of Pigments

2:00 P.M. J. Kenneth Craver, division chairman. *Introductory Remarks.*

2:05 E. G. Bobalek, symposium chairman. *Comments.*

2:10 Willard H. Madson and Willard F. Spengeman. *A Review of Some Pigment-Vehicle Relationships.*

2:55 B. G. Brand, R. J. Deibert and E. R. Mueller. *Effect of Extender Particle Size on Gloss of Outside House Paints.*

3:15 Stanley le Sota. *Water Sorption of Low Opacity Pigments in Vinyl and Acrylic Latex.*

3:35 H. T. Lacey, G. L. Roberts and V. A. Giambalvo. *Properties of Phthalocyanine Pigments. Flocculation of Copper Phthalocyanine.*

3:55 Raymond R. Myers and Heinz Traitteur. *The Physical Stability of Dispersion. The Flooding of Binary Pigments Systems.*

4:15 Jack E. Cowling and Frank M. Noonan. *High Visibility Paints.*

TUESDAY, APRIL 9

Naval Stores Symposium

9:00 A.M. J. Kenneth Craver, division chairman. *Introductory Remarks.*

9:05 H. J. Rose, symposium chairman. *Comments.*

9:10 Doris E. Baldwin, Virginia M. Loeblich and Ray V. Lawrence. *The Acidic Composition of Oleoresins and Rosins.*

9:25 Virginia M. Loeblich and Ray V. Lawrence. *Inhibition of Resin Acid Isomerization.*

9:50 Edward McC. Roberts, N. Mason Joye and Ray V. Lawrence. *A Survey of the Non-Acidic Components of Commercial Gum Rosin.*

10:00 J. B. Montgomery, A. N. Hoffmann, A. L. Glasebrook and J. I. Thigpen. *Catalytic Perhydrogenation of Rosin.*

10:25 D. R. Levering and A. L. Glasebrook. *The Oxonation of Rosin.*

10:50 E. Earl Royals and Joseph L. Greene, Jr. *Condensation of Aldehydes with Abietic Acid.*

11:15 Jacob C. Minor and Ray V. Lawrence. *Esterification of Methylolated Rosin.*

11:30 Noah J. Halbrook and Ray V. Lawrence. *Fumaric Modified Rosin.*

2:00 P.M. T. L. Smith and J. H. Elliott. *Esterification of Resin Acids.*

2:25 S. James Goodkin and Joseph A. Trivisone. *Effects of Modifying Agents on Physical and Solubility Characteristics of Ester Gums.*

(Turn to page 107)

DRIERS

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ZIRCONIUM 6%

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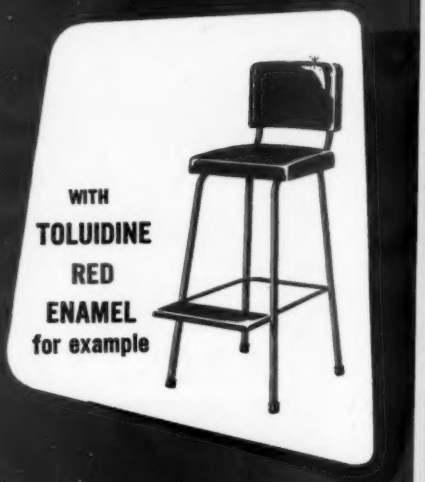

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In a vehicle blend of tall oil alkyd and oleoresinous maleic varnish, a drier combination based on Nuodex Cobalt 6% and Nuodex Octoate Zirconium 6% gave tack-free, overnight dry at 50 to 62°F. Another case where Nuodex Zirconium 6% and cooperative research of the Nuodex Protective Coatings Laboratory helped solve a specific problem.

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TO HELP MAKE GOOD PAINTS BETTER

DRIERS—FUNGICIDES
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LOSS OF DRY INHIBITORS—BODYING AGENTS

Good news for the Paint Industry

NOW! NEW FORM OF HIGHER DENSITY ZINC OXIDE CUTS COSTS, DOUBLES STORAGE CAPACITY, SPEEDS PRODUCTION WITH *NO* CHANGE IN CHEMICAL PROPERTIES AND WITH *ONLY ONE* CHANGE IN PHYSICAL PROPERTIES . . . *APPARENT DENSITY.*

Dramatic proof of the high density of AZODOX as compared with AZO-ZZZ paint grade zinc oxides which, themselves, are more dense than conventional zinc oxides.

AZODOX

DE-AERATED ZINC OXIDE

AZODOX is the result of a manufacturing process new to the zinc oxide industry. Here, at last, is a zinc oxide with all the desirable qualities of AZO-ZZZ, American Process, paint grade zinc oxides—plus time-saving, labor-saving and money-saving advantages that no other form of zinc oxide possesses to the same degree. Samples and test lots of factory proved AZODOX now available for you. *There is no increase in price over conventional zinc oxide.*

HERE'S WHY AZODOX IS BEST FOR YOU

Twice the Density, Half the Bulk. AZODOX cuts storage space in half. Despite high density, perfect texture of material is unchanged. AZODOX package is shaped, permitting close-packed, well-formed unitized shipments.

Increased Mixing Capacity. AZODOX incorporates readily in oil, disperses completely. Its high density, low bulk gives greater capacity, steps up production of both mixers and mills.

Flows More Freely, Less Dusting than conventional zinc oxides.

Physical Properties Unchanged Except for Density. Consistency, particle size and shape, color and all other physical properties *except apparent density* are unaltered. And *all* chemical properties are unchanged.

Azodox Cuts Your Costs. Faster handling, easier storing, quicker mixing save you money.

American Zinc sales company

DISTRIBUTORS FOR AMERICAN ZINC, LEAD & SMELTING COMPANY

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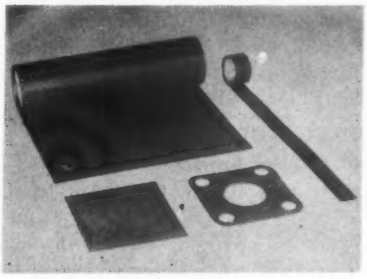
NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



CHICAGO GASKET

PLASTIC TAPE
In All Shapes

A plastic tape said to combine best elements of fiberglass and Teflon has been developed.

Claimed to be highly resistant to chemicals, solvents and temperature extremes, with good insulation characteristics and high degree of dimensional stability and mechanical strength.

Product, named Korda-Flex, is available in tapes, sheets and rolls, and in belts, pads or other shapes produced by die cutting, heat welding or stitching.

Chicago Gasket Co., Dept. PVP, 1271 West North Ave., Chicago 22, Ill.

WATER SOLUBLE RESIN
For Water Paints

A new water soluble resin, DMHF (Dimthyl Hydantoin Formaldehyde), may be used for water paints, for temporary metal coatings, for lining drums or rubber hoses which carry corrosive liquids, and in binders for pigments, inks and abrasives.

The new substance is described as water-white and practically odorless, with a melting range of 59-80° C. It is said to dissolve rapidly in water, in all proportions, to give solutions of low viscosity. A 10 per cent water solution is almost neutral.

Other solubility data reported states that DMHF is soluble in methanol, ethanol, ethyl acetate and methylethyl ketone. It is insoluble in benzene and petroleum ether.

The resin is compatible in various concentrations with glycols, urethane, "Carbowax", polyvinyl alcohol, neutralized polyacrylic acid, sodium carboxy methyl cellulose, casein and zein. Glyco Products Co., Inc., Dept. PVP, Empire State Bldg., New York 1, N. Y.

PLASTICIZER
For Pigment Grinding

A high-molecular-weight polymeric plasticizer for dispersions and pigment grinding is being introduced.

Product is said to permit easy processing on conventional equipment. Claimed to provide all the extreme permanence characteristics of high-molecular-weight polymerics, as well as excellent electrical properties.

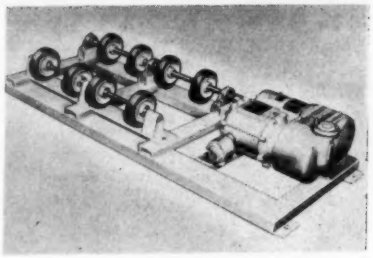
Information and booklet titled "Emery 3049-S Polymeric Plasticizer" available by writing Emery Industries, Inc., Dept. PVP, Carew Tower, Cincinnati 2, Ohio.

AUTOMATIC STAPLER
No Electrical Connections

Model Tap-2 stapler is air operated with fully pneumatic controls. No solenoids, relays, switches, wiring or fuses. Automatic lubrication said to be assured by unique valving arrangement.

Recommended by company for closing overlap cartons, long narrow slotted end closing cartons, and telescope cartons. Can also be used for regular slotted cartons.

Automatic mechanical trip claimed to be important innovation. Container Stapling Corp., Dept. PVP, 308 North Park Ave., Herrin, Ill.



MORSE

DRUM ROTATOR
Variable Speed

A stationary drum rotator for blending, tumbling and mixing is available. The model, 1-5154VS, is designed to handle loads from 500 to 1,000 pounds.

With a pre-lubricated, fully sealed ½ HP motor having a 6:1 variable speed gear reduction, the unit is said to rotate 30 to 55 gallon 24" diameter drums at any speed from 7 to 40 RPM. Motor connects with 1" diameter-shaft to operate four 6" diameter Neoprene drive wheels. Four 6" diameter roller bearing idler wheels mounted on a ¾" diameter shaft are said to assure smooth running.

Idler plate and drive and idler wheels adjustable. Morse Manufacturing Co., Inc., Dept. PVP, 727 W. Manlius St., East Syracuse, N. Y.

PIGMENT PASTES
For Latex Emulsion Paints

Water dispersible pigment pastes for latex emulsion paints featuring high solids content, compatibility with all accepted water emulsion vehicles and high tinting strength are available.

Solids contents said to range up to 70 per cent in nine colors comprising "Tulip-Tone" line. Reduction in water content claimed to permit better control of paint formulation and easier handling in production.

Company claims storage space reduced by approximately 50 per cent.

Available in Permanent Yellows, Toluidine Reds, Scarlet Red, Naphthol Red, and Permanent Blues and Greens, pastes are compatible with styrene-butadiene, acrylic, polyvinyl acetate and other water emulsion vehicles.

Holland Color & Chemical Co., Dept. PVP, Holland, Mich.

METHALLYL CHLORIDE
For Organic Synthesis

Methallyl chloride is now commercially available for use in the resin and plastics field and in organic synthesis.

The highly electro-negative character of the carbon-to-carbon double bond in the methallyl structure is said to enable methallyl monomers to show enhanced reactivity as co-monomers in free radical polymerization.

The product can be self-polymerized or copolymerized with a wide variety of reactive monomers, according to company.

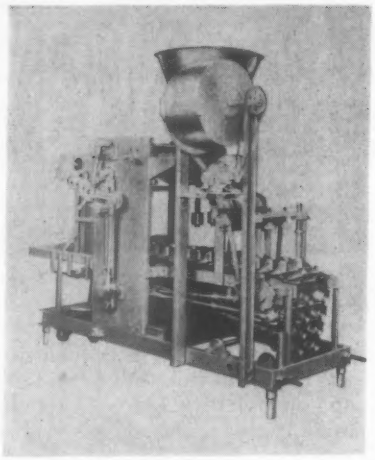
Presence of two highly reactive centers in the methallyl chloride molecule suggests use for the chloride as an intermediate in organic synthesis. FMC Organic Chemicals Division, Food Machinery and Chemical Corp., Dept. PVP, 161 East 42nd St., New York 17, N. Y.

ORGANIC MONOMER
Pilot Plant Quantities

Glycidyl methacrylate for the introduction of epoxide groups into vinyl polymers or vinyl groups into condensation polymers is available in experimental quantities.

Glycidyl methacrylate is a light-colored, almost odorless liquid. The monomer may be polymerized or copolymerized through the double bond and further reacted through the expoxide, or the oxirane ring may be first polymerized so as to leave the vinyl group available for crosslinking.

It will polymerize thermally with ultra-violet light, or with free radical or ionic polymerization catalysts. Technical data and samples available from Room 7021-D, Du Pont Co., Dept. PVP, Wilmington 98, Del.



HOPE

FILLING MACHINE
For Fiber Cartridges

High-speed, heavy-duty filling machine, claimed to be the first of its kind for packing of fiber cartridges with caulking, roofing cement, buffing compound and similar viscous materials, has been introduced.

The machine, known as Type 27 Cartridge Filler, is said to provide greater filling speed with less labor.

Only one operator is required to feed cartridges into the dispensing stacks at the infeed end. The same operator keeps the unscrambler barrel filled with lids and checks the machine's performance.

Cartridges are automatically removed from the dispensing stack and conveyed to the filling station, where they are filled from the bottom up to insure a uniform fill without air pockets.

An unscrambler barrel is provided to supply lids to feed chutes mounted above each filling line. In the next operation, the press station pushes each lid firmly into the cartridge to the required depth.

Cartridges are automatically ejected from holding pockets at the discharge end of the machine and a conveyor belt carries them to the packing department.

Hope Machine Co., Dept. PVP, 9400 State Road, Philadelphia 14, Pa.

FAST-CURING RESINS
High Impact Resistance

Company announces two fast-curing surface coating resins, said to provide maximum hardness and greater impact and chemical resistance than conventional finishes.

Both Cyzac 1006 and Cyzac 1007 are said to provide flexibility, high initial gloss and gloss retention, good enamel stability and better adhesion than conventional finishes.

Cyzac 1006, without primer, is for use when initial color and color retention are important. Cyzac 1007, with primer, gives baked finishes with unusually good adhesion and impact resistance. Both are compatible with most commonly used pigments dispersed by roller or pebble mill grinding, and are available from American Cyanamid Co., Plastics & Resins Division, Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.

THIXOTROPIC VEHICLES
For Interior Finishes

"Arothix 4000-ML-40" has been announced as the first in a new line of thixotropic vehicles for interior finishes. Company states it was developed for use in "jell" flat wall paints, wall primer sealers and enamel undercoats.

In amounts up to 25 per cent, the new vehicle can also be used to modify other architectural type finishes, manufacturer says. It is claimed that such use promotes ease of application, non-settling and non-sagging.

Properties attributed to "Arothix 4000-ML-40" hold that it is thoroughly compatible with medium oil alkyds, long oil alkyds and "Q" linseed oil, has excellent color retention properties, sets to touch in 20 minutes and dries tack-free in six hours. Archer-Daniels-Midland Co., Dept. PVP, 700 Investors Bldg., Minneapolis 2, Minn.

GRADUATED CYLINDERS
High Accuracy

A line of Shellbach graduated cylinders is now available, featuring Shellbach graduations and lifetime blue and white striping.

High accuracy is claimed for wide blue vertical line bordered by bands of etched glass on the lime-glass cylinders. Banding method is said to allow high visibility and accurate lining up of the meniscus against the graduations.

Information and catalog materials available from Kern Laboratory Supply Co., Dept. PVP, 8639 Venice Blvd., Los Angeles 34, Calif.

Only Continental offers you

Perma-Lined

steel containers for hard-to-hold products

Your chemical, paint and petroleum products travel with greater safety in Continental's exclusive Perma-Lined steel containers. That's because specially-formulated Perma-Lining enamels are airless hot-sprayed and baked right in the formed container. Every last inch of inside surface—even side and bottom seams—gets complete uniform coverage.

In addition to product protection, Perma-Lined containers give you eye-catching lithography by Continental craftsmen. And, if you ever need research or engineering help, it's available as part of our steel container service.

Let Continental's Perma-Lined containers work for your hard-to-hold products. Call soon.

PERMA-LINED CONTAINERS TO FIT EVERY PRODUCT

Perfected by Continental's Research and Development Center in Chicago —and backed by our vast experience in all types of metal packaging—Perma-Linings are available to fit almost every chemical, paint and petroleum product. Moreover, we are prepared to develop new Perma-Linings for your special use.

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Pacific Division: Russ Building, San Francisco 4

Better odorless paints start with

SOVASOL 35

. . . Meets the top standards for the industry!

SOVASOL 35 is an isoparaffinic of the "odorless mineral spirit" class. Its excellent odor characteristics and unusual ability to give false body in paint formulations make it ideal for use in interior protective coatings.

SOVASOL 35 is widely used in the formulation of odorless alkyd-type flats, semi-gloss and certain enamel-type interior paints for trade sales goods, where odorless paint is desired.

It is water white in color and passes all pertinent stability and copper corrosion tests. It is practically odorless, is doctor sweet and is relatively color stable.

For complete information about *Sovasol 35*—and how it can improve *your* products—call your Socony Mobil representative, or write the address below.

SOCONY MOBIL

OIL COMPANY, INC.

150 EAST 42nd ST., NEW YORK 17, N. Y.

Mobil

PERSONNEL CHANGES

W. W. Gram

L. F. Kautz

SHERWIN-WILLIAMS

William W. Gram has been appointed Assistant to the President of the Sherwin-Williams Co. He succeeds **E. Colin Baldwin** who was recently named Executive Vice President and a director of the Sherwin-Williams Co. of Canada, Ltd.

Mr. Gram, a native Clevelander, has been General Superintendent of the paint firm's Newark, N. J., paint and varnish plant since 1953. Prior to that, he served successively as Assistant Superintendent at Newark, Production Superintendent for all of the company's plants, and Superintendent of Paint Production at Chicago.

Lloyd F. Kautz has been assigned as the new General Superintendent at the Newark, N. J., factory, replacing Mr. Gram.

A graduate in chemical engineering from the University of Cincinnati, Mr. Krautz joined John Lucas Co., a subsidiary of Sherwin-Williams, in 1936. He was transferred to Sherwin-Williams' Newark Laboratory two years later, and was appointed Technical Director there in 1943. In 1951 he was named Assistant General Superintendent at the Newark plant, the post he held immediately prior to his present assignment.

Several appointments involving purchasing personnel have also been made by Sherwin-Williams.

W. D. Mitchell

A. J. Millavec

W. D. Mitchell and **A. J. Millavec** have been named assistant directors of purchases. The former will head up procurement of pigments, chemicals and tin mill products; the latter will direct purchases of all paint, varnish and lacquer raw materials with the exception of pigments.

Mr. Mitchell has been associated with Sherwin-Williams since 1925, and for the past 11 years has been Manager of the paint firm's Chicago purchasing department. Mr. Millavec joined the company in 1917 and has been associated with purchasing activities in Cleveland throughout his career with the firm. Both of the new assistant directors of purchases will be located at the firm's national headquarters in Cleveland.

Succeeding Mr. Mitchell as Manager of the Chicago purchasing department is **V. G. Howles,** a veteran of 30 years' service with Sherwin-Williams. He will have as his assistant **O. A. Hartmann** who joined the company in 1942. They will headquarter at the company's Chicago plant.

K. E. Jaster, buyer of chemicals in Cleveland, retired December 31. Mr. Jaster had been with Sherwin-Williams since 1917.

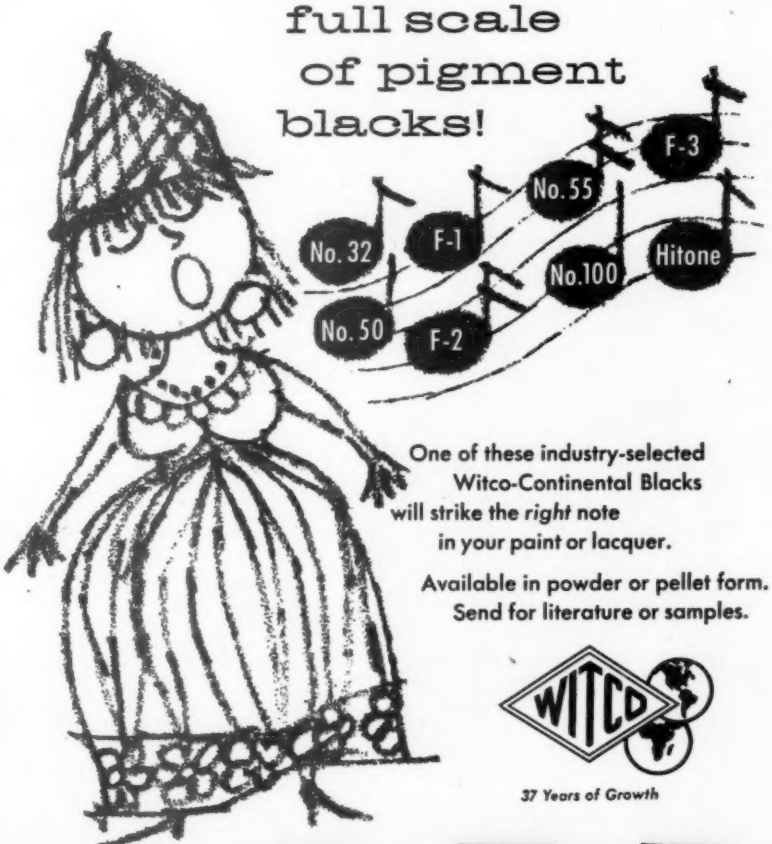
CAL INK

J. Dick Mullen is the firm's new sales agent in the Rocky Mountain area, Mr. C. D. Leigh, manager of the Raw Materials Division, announced.

Mr. Mullen is the manager of the Denver office of Gillies Western Corporation. He will handle Cal Ink's line of colorants, dispersions and vehicles for paint manufacturers in Colorado, Wyoming, Utah, New Mexico and northern Texas.

WITCOBLAK®

a full scale of pigment blacks!



One of these industry-selected Witco-Continental Blacks will strike the *right* note in your paint or lacquer.

Available in powder or pellet form. Send for literature or samples.

WITCO

37 Years of Growth

WITCO CHEMICAL COMPANY
CONTINENTAL CARBON COMPANY
122 East 42nd Street, New York 17, N.Y.
Chicago • Boston • Akron • Atlanta • Houston • Los Angeles • San Francisco • London and Manchester, England

Competitive

Bid . . . after bid . . . after bid

Call

Cargill

Incorporated

PRODUCT OF Cargill CREATIVE PROCESSING

Suppliers to the Paint and Varnish Industry

Linseed Oil • Soybean Oil • Fish Oil • Alkyd Resins • Specialty Products

SPENCER KELLOGG

Fred A. Bristol, Jr., has been named successor to **Richard A. Nagel** as technical service representative for the company's Eastern Division, it has been announced.

F. A. Bristol

Mr. Nagel recently assumed duties as district sales manager in charge of the Philadelphia territory.

Mr. Bristol graduated from North Dakota State College in 1949 and joined the Kellogg organization, being assigned to the Technical Service Laboratory.

He is a member of the Western New York Paint and Varnish Production Club.

CARBIDE AND CARBON

J. Lee Marsh has been appointed Vice-President—Development of Carbide and Carbon Chemicals Co., Division of Union Carbide and Carbon Corp. He will be responsible for the Development Department of the Chemicals Company as well as for all phases of its textile fibers activities.

Dr. Marsh started with Union Carbide in 1933 in the Engineering Department of Carbide and Carbon Chemicals Co., at South Charleston, W. Va. He moved to New York in 1946 to fill a staff position under one of the company's vice presidents. In 1952 he returned to South Charleston to become Director of Engineering for the company, which position he held at the time of the present appointment.

L. W. Newton has been appointed Assistant to the Vice President—Research, according to an announcement by G. H. Law, Vice President—Research.

Dr. Newton joined Union Carbide in 1941 in the Research Department of Carbide and Carbon Chemicals Co., at South Charleston, W. Va. His work since then has been in the fields of organic acids, plasticizers, and nitrogenous substances. He was made a Group Leader in the Department in 1951 and appointed Assistant Superintendent of Research in 1954. He had been engaged principally in administrative duties at Carbide's Research Center in South Charleston prior to his current promotion.

Gordon W. McBride, chemical engineering consultant, has joined the Washington, D. C. staff of Carbide and Carbon Chemicals Co. as Technical Coordinator. In that capacity he will provide liaison between Carbide and Carbon Chemicals Co. and government research agencies and laboratories.

Mr. McBride has been in consulting practice in Washington with his father since 1939, except during World War II when he worked as a chemical engineer in the United States Department of Agriculture. For many years he has served industry in liaison work with the Federal Government's technical Programs.

Eight technical representatives have been newly assigned by the Sales Department of Carbide and Carbon Chemicals Co. to district offices of the company.

The assignments are: **W. P. Emerson** and **A. A. Jackson** to the Atlanta District; **C. D. Schmidt** to the Chicago District; **R. C. McQueen** to the Kansas City District; **J. A. Buser** to the New York District; **C. G. Herion** to the Los Angeles District; and **G. W. Cochrane** to the San Francisco District.

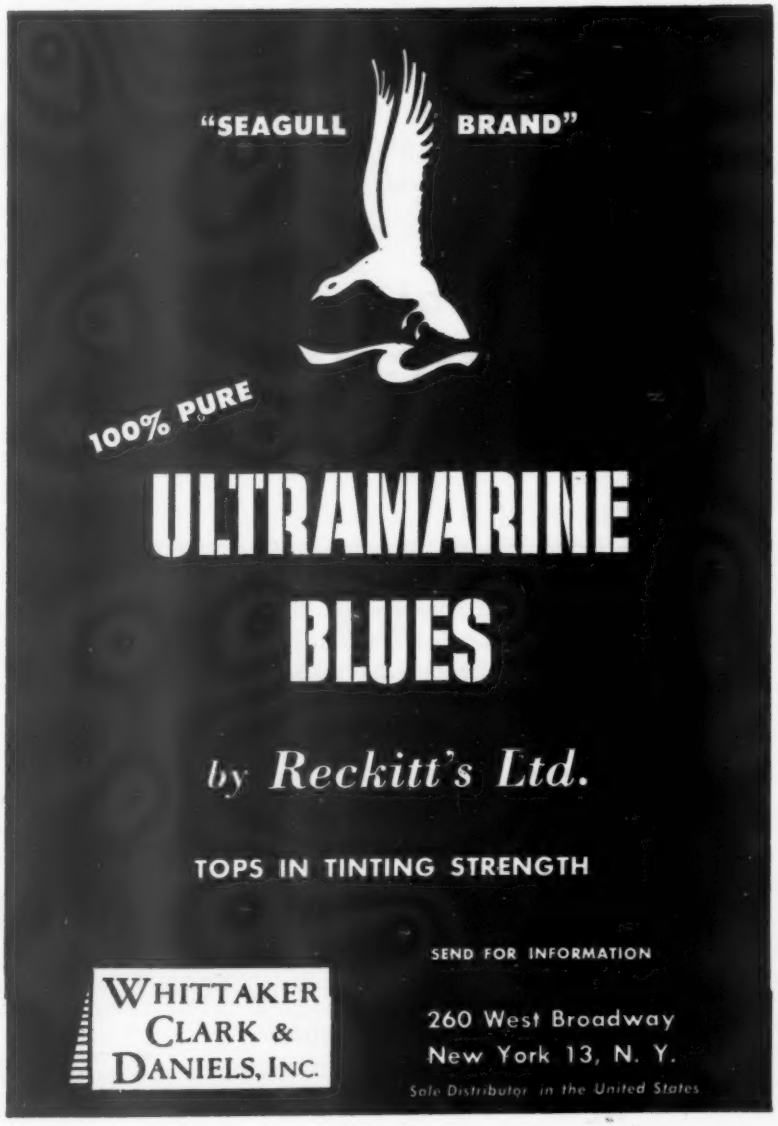
Five group leaders have been appointed in the Development Department at the South Charleston plant of Carbide and Carbon.

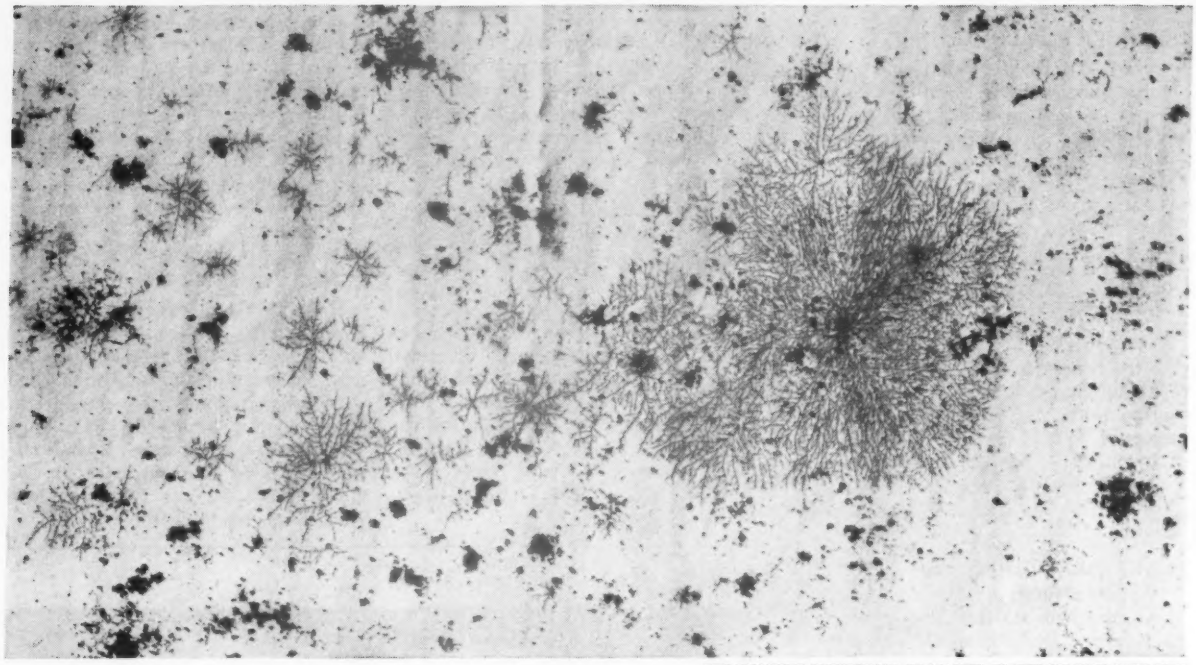
The new group leaders are: **J. W. Chatfield** and **J. W. Kearns**, Morris Harvey College; **C. J. Haines,** Juniata College; **J. W. Simeral,** Bethany (W. Va.) College; and **W. H. Swango,** West Virginia Wesleyan College.

AMOCO CHEMICALS

C. L. Parris, chief engineer at the El Dorado, Ark., refinery of the American Oil Co., has been named manager of the new organization's midwest area plant.

Mr. Parris joined the Engineering Department of Standard Oil Co. (Indiana) in 1942, and became a supervisor in 1947. He is a graduate in Civil Engineering of Texas Tech, and holds an M.S. degree from Illinois Tech.





TEN DIAMETER PHOTOGRAPH OF MILDEW AT NEW ORLEANS TEST SITE

HAVING MILDEW PROBLEMS?

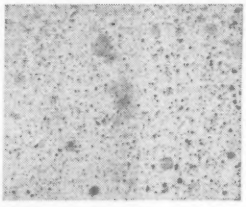
Then, formulate with

EAGLE-PICHER
Leaded Zinc Oxide

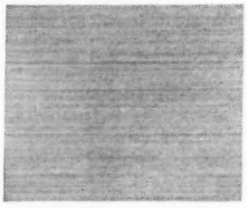
WITH EAGLE-PICHER LEADED ZINC OXIDE in your house paint formulation, you can provide improved resistance to mildew. Yes, scientific tests prove that house paints formulated with Eagle-Picher Leaded Zinc Oxide not only resist mildew discoloration but offer far superior decorative value and longer life at low cost.

HERE'S PROOF OF MILDEW RESISTANCE IN HOUSE PAINTS!

Tests made at Eagle-Picher Test Farm, New Orleans, La.



Mildew discoloration after 5 months vertical south exposure, without Eagle-Picher Leaded Zinc Oxide. (No fungicide used.)



No mildew after 5 months vertical south exposure, with paint* made from Eagle-Picher Leaded Zinc Oxide. (No fungicide used.)

***Formulation of Leaded Zinc Oxide Paint Used in Test**

Pigment—62.2%		Vehicle—37.8%	
E-P #356 Leaded ZnO	50.0%	Raw Linseed Oil	60.5%
TiO_2—Anatase	15.0	Z-3 Linseed Oil	19.5
Magnesium Silicate	35.0	Mineral Spirits	18.2
	100.0%	24% Pb	1.3
		6% Co	.5
			100.0%

PVC—32.0%

Since 1843

EAGLE PICHER

THE EAGLE-PICHER COMPANY

Largest Producer of Both Zinc and Lead Pigments

General Offices: Cincinnati 1, Ohio

Regional Sales Offices: Chicago, Cleveland, Dallas, New York, Philadelphia, Pittsburgh

West Coast Sales Agent
THE BUNKER HILL COMPANY, Chemical Products Division
Seattle • Portland • Oakland • San Francisco • Los Angeles • Kellogg, Idaho

REARDON COMPANY

Harold F. Volgstadt has become vice president of the firm, according to an announcement by David H. Morgan, president.

H. Volgstadt

Prior to his promotion, Mr. Volgstadt had been sales manager of the Eastern Division since 1951, after three years as a sales representative.

He is an alumnus of Michigan State University.

HERCULES POWDER

Three new administrative sales assignments in Hercules Powder Company's Synthetics Department have been announced by James W. L. Monkman, the department's Director of Sales.

The new assignments are:

Frank G. Oswald, Industry Sales Manager, responsible for the protective coating; printing ink; and food, drug, and cosmetic industries.

J. G. Little, Sales Manager, Polyols, responsible for the sales, promotion, and technical service of mono- and technical pentaerythritols.

Dr. J. W. Kneisley, Sales Manager, Oxidation Products, in charge of the sales, promotion, and technical service of DMT (dimethyl terephthalate), DMI (dimethyl isophthalate), and methyl toluates.

Mr. Oswald, who joined Hercules in 1937, has a broad background of experience in the protective coatings field. He was connected with the manufacture and sale of chemicals for finishes for 17 years before he joined Hercules as a technical representative. In 1946 he was named Assistant Director of Sales of the Synthetics Department, with emphasis on technical service to the trade. For the past year he has been responsible for the introduction of tall oil fatty acids and other new products of the department.

Mr. Little's career with Hercules includes service as a research chemist at the company's Research Center and as a technical service representative in development work, before being named manager of the department's Chicago sales district in 1948. He served in this latter position until 1954 when he was transferred to the Wilmington, Del., home office. For the past two years he has been an industry sales manager for the Wilmington office.

Dr. Kneisley joined Hercules in 1943 as a research chemist. From 1944 to 1946 he was engaged in laboratory development work at the company's Parlin, N. J., Plant. In 1949 he was named a supervisor in Synthetics' Research Division at the Research Center, and in 1952 was made a technical representative in the Development Division of the Synthetics Department.

New assignments have also been made in the Cellulose Products Department of Hercules Powder Co. and reported by Werner C. Brown, the department's Director of Sales.

The new adjustments are as follows:

J. B. Martin, who has been supervising plastics promotional activities, is transferred to the company's Export Department to develop export plastics markets; **Robert C. Clark,** who has been manager of the department's Cincinnati office, is transferred to Wilmington to aid in plastics sales and promotional work; and **Gregory N. Bruxelles,** at present a member of the sales development staff, is named manager of the department's Cincinnati office.

Additionally, **J. J. Coughlan** has been transferred to the Cellulose Product Department's Boston district office as a technical sales representative for plastics; **C. A. Borton** has been transferred to the New York office in the same capacity; and **Vincent E. Walsh** has been transferred as a technical sales representative to the Cincinnati district.

GENERAL ELECTRIC

Dr. Roland E. Kreibich has been named product engineer in the Phenolic Products Section of the company's Chemical Materials Department in Pittsfield, Mass.

Dr. Kreibich is a native of Czechoslovakia, and a graduate of the Karl Franzens University in Graz, Austria.

"Reduce Your Costs"

With

SELECTED FISH OIL

SPECIFICATIONS:

COLOR 11 PLUS G.H.
F. F. A. 2% MAXIMUM
M. & I. 0.30%
IODINE 170 MIN.—195 MAX.

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KETTLE BLEACHES WITH NO OBJECTIONABLE ODOR

AVAILABLE IMMEDIATELY IN DRUMS AND TANK CARS

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Agents in principal cities

CALIFORNIA SPECIFICATIONS
84 pounds of Celite 281 or 110 is specified by the California Division of Highways for every 100 gallons of white traffic line paint (State Specification 55-G-95). 80 pounds of Celite 110 is specified for 100 gallons of yellow traffic paint (State Specification 55-G-98).
In traffic paints, you need two things: visibility and durability

To boost visibility and lengthen service life the state of California specifies CELITE diatomite

TRAFFIC flows more smoothly . . . accidents are reduced when traffic lines and direction markings are easier to see. That's why many states specify Celite* in their traffic paints. Celite's microscopic particles roughen the texture, increase reflectivity and give you a roadway stripe that is highly visible day and night.

At the same time, Celite's unique particle structure produces an interlacing film reinforcement for better resistance to abrasion and cracking. Johns-Manville Celite also promotes rapid solvent release for faster drying stripes.

Find out how Celite helps improve visibility and durability in traffic paints. Write for further information to Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

JM Johns-Manville CELITE Diatomite Pigments

it takes more than

A KETTLE *and* A COOK BOOK

While the man with the brush in his hand may think making paint is that simple, modern manufacturers know the laboratory skill that goes into the process today.

Liquid Carbonic's technicians have been working shoulder to shoulder with paint men for years — they've learned a lot about resin production and how carbonic gas can help make better resins at lower cost.

Are You Using All of These Modern Methods

Here are some of the many ways in which CO_2 is helping to do a better job and lower costs.

- Cuts oil cooking time 2/3
- Retards oxidation in thinning tanks and provides fire proof blanket
- Prevents "skinning" in storage
- Safest transfer medium for flammable fluids
- Purges filters, recovers oil, reduces cleaning time and frequency of cleanings
- Prevents flash fires, explosions — CO_2 provides a heavier-than-air "blanket" that displaces oxygen
- Prevents skinning and eliminates costly cleanouts of transport containers

World's Largest Producer of CO_2

THE LIQUID CARBONIC CORPORATION
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FREE BULLETIN

Gives complete details on the uses above plus other important CO_2 applications in the paint and varnish industry. Send for your copy of "The Use of CO_2 in Paint, Varnish and other Alkyd-Type Resin Manufacturing."

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Please send me your technical bulletin on the uses of CO_2 in the paint and varnish industry.

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ARCHER-DANIELS-MIDLAND

W. C. Mueller has been named to the new position of Assistant to the Division Manager for the resin sales organization of Archer-Daniels-Midland Co., Minneapolis. Meanwhile, **E. W. Kaufmann,** formerly regional manager in charge of the territory served by the Philadelphia sales office, was appointed Sales Manager for Resins.

As a further part of the A-D-M sales realignment, **Fred J. Burnett,** former sales manager of Glyptal resins for General Electric Co., has been designated Sales Manager for A-D-M Industrial Resins. Mr. Burnett joined A-D-M after it purchased rights to manufacture the Glyptal resins.

Four resin sales regions have been established. Appointed supervisors of these new sales regions were **Clyde C. West,** Los Angeles; **Earl Erlandson,** Chicago; **Gale Smith,** Cleveland; and **William R. Dodds,** Newark, N. J.

The regional executives will supervise resin sales and introduction of new products in the areas served by A-D-M branch offices and agents as follows:

Mr. West in Los Angeles, San Francisco, Portland and Seattle; Mr. Erlandson in Chicago, Milwaukee, St. Louis, Atlanta, Memphis and New Orleans; Mr. Smith in Cleveland, Buffalo, Cincinnati, Pittsburgh, Detroit, Indianapolis and Louisville; and Mr. Dodds in New York, Cambridge, Philadelphia and Baltimore.

Dr. George K. Nelson, A-D-M Director of Development, has announced the appointment of two new development chemists in the Development Department. They are **Richard J. Savage,** formerly director of product application in the Marco products department of Celanese Corp., Newark, N. J., and **Royce G. Freese,** formerly project leader in the commercial development group of General Mills, Minneapolis.

Mr. Savage, a graduate of Marietta College, has been engaged in sales, technical and product development work in the plastics and chemical fields since 1940. He is a member of the Society of Plastics Industries, Society of Plastics Engineers and American Society for Testing Materials.

Mr. Freese is a graduate of the University of Minnesota. He was associated with Eastman Kodak Co. as a chemical engineer before joining General Mills.

WEST VIRGINIA PULP & PAPER

H. E. Coleman has joined the Polychemicals Division as sales manager, the firm announced.

H. E. Coleman

Mr. Coleman has ten years of marketing experience in the chemical field as salesman, assistant sales manager and most recently as general sales manager of the Kelco Company.

Educated at the U. S. Naval Academy at Annapolis, Md., Mr. Coleman served as a Marine captain during World War II.

UNITED STATES TESTING

Ralph J. Addesso has become a senior chemist in the Chemistry Department, the company has announced.

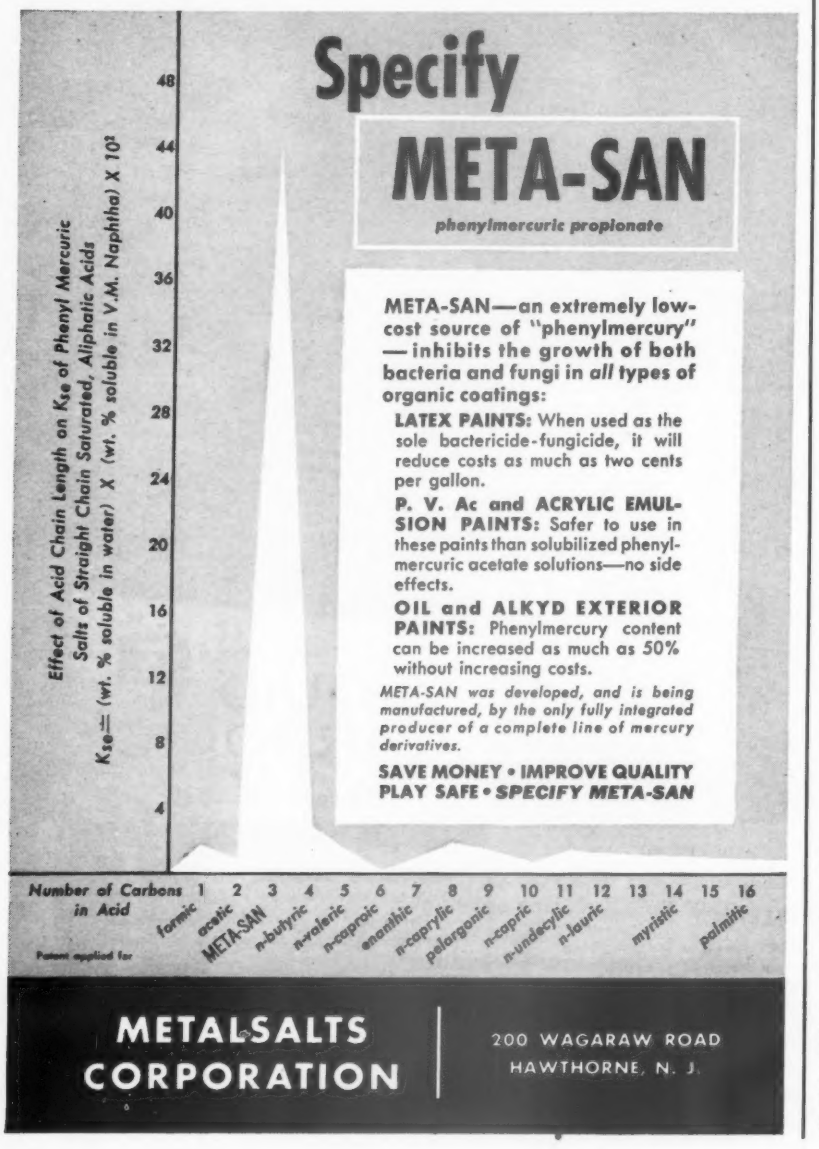
Mr. Addesso, an organic chemist, was with the Fleischmann Laboratories of Standard Brands, Inc., of Stamford, Conn., prior to his joining the firm. He had also been an analytical chemist at Warner-Hudnut, Inc., in New York City.

Mr. Addesso holds a B.S. in Chemistry from CCNY, and served for three years in the Chemical Warfare Branch of the U. S. Army.

U. S. I.

Eugene F. Hoffmann has been named manager of the Cincinnati sales office, it was announced by Alden R. Ludlow, Jr., director of sales. He succeeds **Elmer Bulthaup,** who was Cincinnati manager until his death in early January.

Mr. Hoffmann has been with National Distillers, parent organization, since 1946, and has been in the U.S.I. sales office for the past six years. He is a graduate of St. Joseph's College, Rensselaer, Ind., and a member of the Cincinnati Drug and Cosmetic Club.


Specify
META-SAN
phenylmercuric propionate
Effect of Acid Chain Length on Kse of Phenyl Mercuric Salts of Straight Chain Saturated, Aliphatic Acids
Kse = (wt. % soluble in water) X (wt. % soluble in V.M. Naphtha) X 10²
48
44
40
36
32
28
24
20
16
12
8
4
META-SAN—an extremely low-cost source of "phenylmercury" — inhibits the growth of both bacteria and fungi in all types of organic coatings:
LATEX PAINTS: When used as the sole bactericide-fungicide, it will reduce costs as much as two cents per gallon.
P. V. Ac and ACRYLIC EMULSION PAINTS: Safer to use in these paints than solubilized phenylmercuric acetate solutions—no side effects.
OIL and ALKYD EXTERIOR PAINTS: Phenylmercury content can be increased as much as 50% without increasing costs.
META-SAN was developed, and is being manufactured, by the only fully integrated producer of a complete line of mercury derivatives.
SAVE MONEY • IMPROVE QUALITY
PLAY SAFE • SPECIFY META-SAN
Number of Carbons in Acid
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
formic
acetic
META-SAN
n-butyric
n-valeric
n-caproic
enanthic
n-caprylic
pelargonic
n-capric
n-undecylic
n-lauric
myristic
palmitic
Patent applied for
METALSALTS CORPORATION
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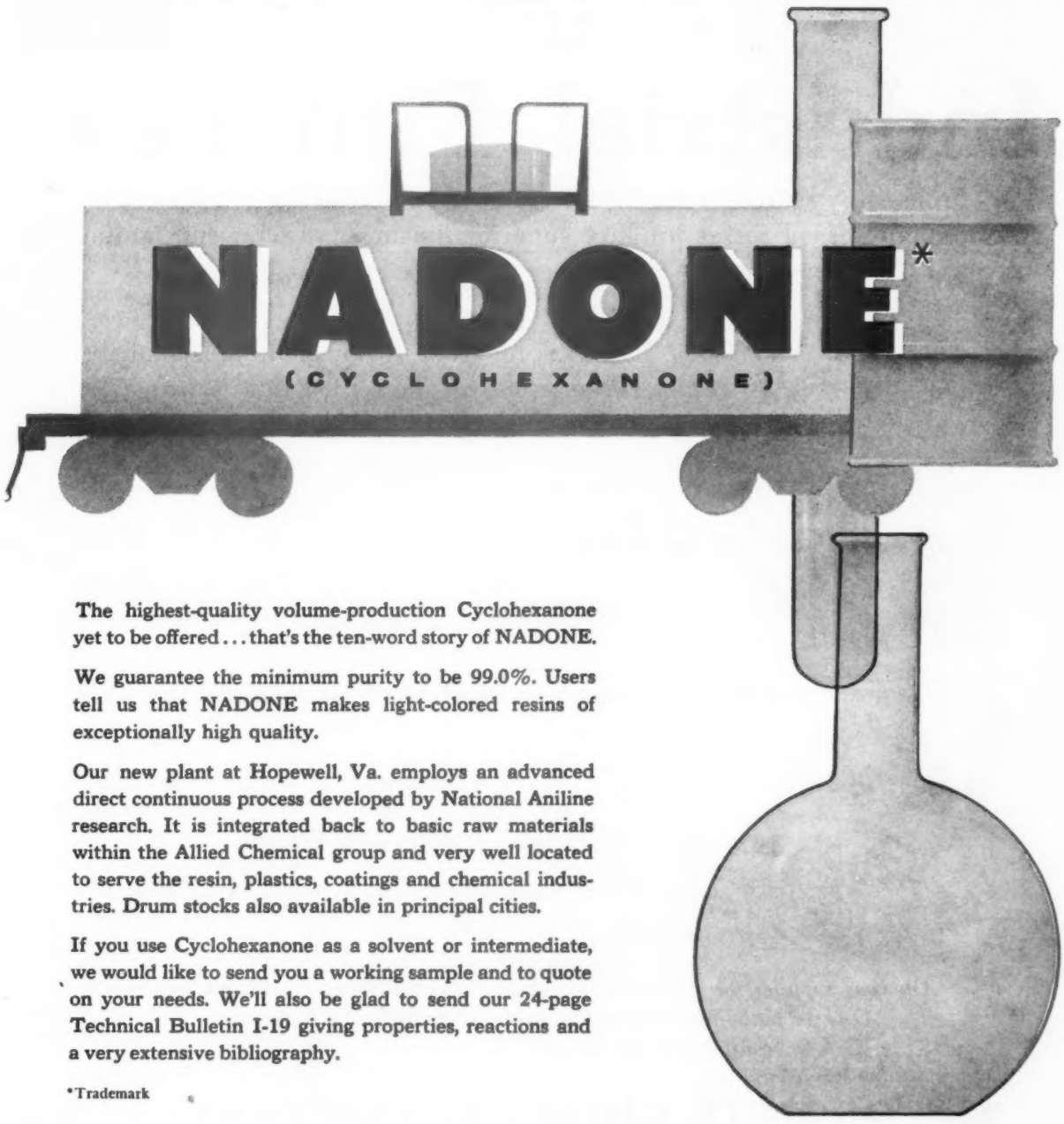
the highest quality you can get in any quantity you can use!



The highest-quality volume-production Cyclohexanone yet to be offered . . . that's the ten-word story of NADONE.

We guarantee the minimum purity to be 99.0%. Users tell us that NADONE makes light-colored resins of exceptionally high quality.

Our new plant at Hopewell, Va. employs an advanced direct continuous process developed by National Aniline research. It is integrated back to basic raw materials within the Allied Chemical group and very well located to serve the resin, plastics, coatings and chemical industries. Drum stocks also available in principal cities.

If you use Cyclohexanone as a solvent or intermediate, we would like to send you a working sample and to quote on your needs. We'll also be glad to send our 24-page Technical Bulletin I-19 giving properties, reactions and a very extensive bibliography.

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BIG ADVANCE in Industrial Finishes

From every source—resin manufacturer or industrial user—the story is, "Isophthalic based resins produce superior finishes and offer substantial savings." And, here's how.

Fast Dry Faster dry-times are obtainable from Isophthalic resins. For example, at 25% oil length a "set-time" of less than 5 minutes and a "through-dry time" of one hour can be obtained with an Isophthalic based resin.

Good Gloss Weather-Ometer exposure of 170 hours on 35% oil length Isophthalic resins have shown no loss of gloss.

Low Cost New Isophthalic formulations use large amounts of low-cost tall oil fatty acid and glycols—for very attractive resin costs.

Hardness and Flexibility

Isophthalic resin formulations are available that will provide the hardness and flexibility you require.

Ask your supplier for a resin that imparts these properties. Leading sources have Isophthalic based resins available for many applications. Or, contact Oronite directly for further information.

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European Office: 36, Avenue William-Favre, Geneva, Switzerland

4177

WITCO

H. Russell Spielman was named manager of the technical service department, William Wishnick, executive vice president, announced.

H. R. Spielman

Mr. Spielman, who has been with the firm since 1944, was administrative assistant to the manager of the technical service department prior to his promotion. He has also been head of Witco's rubber service laboratory, and was a general technical service representative.

He is a graduate of the University of Missouri, and a member of the American Chemical Society, the Society of Plastics Engineers, the Armed Forces Chemical Assoc., and the Chicago Rubber Group.

DIAMOND ALKALI COMPANY

Charles W. Wheeler is the new manager of solvent sales for the Chlorinated Products Division, according to L. J. Polite, Jr., divisional sales manager.

Mr. Wheeler is responsible for sales of solvents produced at plants in Painesville, Ohio, Belle, W. Va., and Houston, Texas. He was previously associated with the Parker Rust Proof Co. in Detroit.

He is a graduate of Denison University, and was an analytical chemist with Electro-Metallurgical Co. at Niagara Falls, N. Y.

Dr. U. T. Greene has been named to the newly created post of Assistant Director of Commercial Development for Diamond Alkali, Co., Cleveland, Ohio. He takes over the new responsibilities following six months' leave of absence for service as Director of the Chemical and Rubber Division, Business and Defense Services Administration, U. S. Department of Commerce, Washington, D. C.

A native Clevelander, Dr. Greene is returning to the organization which he joined in 1942. At that time he was appointed chief chemist of Diamond Magnesium Co., organized by Diamond Alkali to operate as a Government-built magnesium plant located adjacent to Diamond's Painesville, Ohio, works.

Late in 1945, when the Government closed down the magnesium facility, Diamond transferred Dr. Greene to its central Engineering Department, where he served first as a planning engineer and subsequently as a staff engineer. In 1954 he joined the Commercial Development Department upon its formation and was appointed coordinator in 1955, more than a year prior to accepting his recent Government post.

Philip F. Woerner has been appointed to direct applications research and technical service on calcium carbonates and chlorinated paraffins in the paint and printing ink industries for Diamond Alkali Co. He takes over the responsibilities of the late Ralph W. Craig and will continue to make his headquarters at the Diamond Research Center in Painesville.

Mr. Woerner has become well known in the organic coatings and printing ink fields, prior to and during his work as a technical service representative on Diamond calcium carbonates and Chlorowax. Before joining Diamond in 1948, he had been associated for nine years with Sinclair & Valentine Co., New York, manufacturers of printing inks.

NATIONAL STARCH PRODUCTS

Jerome Stern and **Charles J. Steed, Jr.,** have been promoted to sales supervisors for the East and Midwest respectively for the firm's Resin Division.

Mr. Stern, a graduate of St. Peter's College, joined National's New Products Development group in 1951, later becoming product supervisor. He specialized in the promotion and sale of vinyl copolymers. He will remain at the Plainfield, N. J., sales office.

Mr. Steed graduated from Bradley University and had experience as a paint chemist before joining National Starch. He has represented the firm in the Midwest for the past three years in the sale of vinyl resins, and will remain in Chicago.

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WHEN IT COMES TO NITROCELLULOSE BASE SOLUTIONS

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one name means most

...the one manufacturer devoted exclusively to this one product for over forty years, with the widest range of formulations, perfectly controlled viscosity, the most modern, large-scale facilities, the most reliable deliveries, and really competitive prices. You owe it to yourself to get the Cellofilm story.

MAY WE QUOTE YOU?

IF YOU CUT YOUR OWN COTTON...You may be tying up equipment, floor space and personnel for a job that Cellofilm can do for you, usually at lower cost, always of highest quality, and always on time.

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Surface Active Agent Advawet #33 Tops for Emulsion Paints

A non-ionic, 100% active, surface active agent, ADVAWET #33 is tailor-made for the non-ionic emulsifying and wetting-out of practically all types of emulsion paints.

Developed by ADVANCE, and recommended by leading manufacturers, ADVAWET #33 is —

- Soluble—in water in all proportions, most organic solvents and oils.
- Compatible—with soaps, sulfonated oil and synthetic detergents.
- Stable—against metal salts, acids and alkalies.
- Practically Non-Foaming.

Samples and complete data on ADVAWET #33 are available. Write for yours today.

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SOLVENTS & CHEMICAL
DIV. OF CARLISLE CHEMICAL WORKS, INC.
NEW BRUNSWICK, N. J.

IMPERIAL PAPER & COLOR

Fred S. Booth, Jr., has been appointed district sales manager in the firm's new branch office in Houston, Texas, according to a recent announcement.

F. S. Booth

Mr. Booth was formerly with Union Special Machine Co. of Chicago. He is a graduate of Yale University, with a B.S. in Industrial Administration. He will cover Texas, Louisiana, Arkansas and part of Oklahoma.

In another recent appointment, **Norman E. Brower** became sales representative in the firm's Chicago territory. He has been with Imperial since graduation from Skidmore College in 1951.

N. A. Ray

N. E. Brower

Norman A. Ray became the firm's district sales manager in Quebec Province, Canada. A native of Canada, Mr. Ray graduated from Central Collegiate Institute in 1936, and from the Toronto Technical School two years later.

Mr. Ray will cover Quebec Province and part of Ontario Province including Ottowa and Cornwall.

DU PONT

Walter H. Salzenberg heads the list of high-level promotions in the company resulting from the retirement of **Dr. J. A. Almquist** as assistant general manager of the Polychemicals Department.

Mr. Salzenberg, assistant general manager of the Grasselli Chemicals Department, succeeds Dr. Almquist. A graduate of Lehigh University, he had been in engineering and research work before his promotion to the Grasselli post.

Dr. Wallace E. Gordon, director of the firm's Advertising Department, replaces Mr. Salzenberg in the Grasselli Department.

He had been in research and sales for more than 20 years before becoming director of the Advertising Department. He graduated from Wayne University in 1927, and received a Ph.D. in Organic Chemistry from the University of Michigan in 1933.

Heading the Advertising Department in place of Dr. Gordon is **Frederic A. C. Wardenburg,** director of sales for the Pigments Department. A graduate of Princeton University in 1927, he has been engaged in financial, sales and engineering work.

Robert H. Pohl succeeds Mr. Wardenburg as director of sales for the Pigments Department. He was formerly assistant director to Mr. Wardenburg.

Mr. Pohl's position has been filled by **Dr. Edwin A. Gee,** who was formerly sales manager for pigment colors.

M. James McLain, sales promotion manager of pigment colors, replaces Dr. Gee.

In another du Pont staff change, **Dr. Clement W. Theobold** has been appointed assistant director of the Research Division of the Fabrics & Finishes Department.

Frederick W. Gander succeeds Dr. Theobold as director of the Yerkes Research Laboratory in Buffalo, N. Y.

Dr. Theobold, who has directed the Yerkes Laboratory since 1955, joined the company in 1943 as a research chemist. He received bachelor and masters degrees in Chemistry from the University of Nebraska, and a Ph.D. in Organic Chemistry from the University of Illinois.

Mr. Gander has been a chemical engineer with du Pont since 1946, and was research manager at Yerkes since 1955.

SHERWIN-WILLIAMS

Garmond G. Schurr has been appointed assistant director of paint research for the Sherwin-Williams Co., Arthur B. Holton, technical director, announced.

Mr. Schurr, who will continue at the company's Chicago paint research laboratories, has been working mostly on research in metal corrosion, metal protective paints and high polymer coatings.

A graduate of North Dakota Agricultural College, he is a member of the American Chemical Society, ASTM, the American Statistical Assoc., and the American Society for Quality Control. Mrs. Schurr is chairman of the corrosion committee of the Federation of Paint and Varnish Production Clubs.

ARCHER-DANIELS-MIDLAND

O. L. Yarham has been appointed technical sales representative in the Chicago area for the Chemical Products Division, it was announced by John D. Hetchler, Division sales manager.

Mr. Yarham was formerly with Cities Service Oil Co. as section leader in charge of the lubricating grease research laboratory. He was also a chemical engineer for Battenfeld Grease and Oil Corp. and the Department of Agriculture. He is a graduate of the University of Kansas.

Continuing research has made LX-685 NEVILLE'S most versatile resin

In the few short years since it was introduced, Neville LX-685 has been employed with evident success in the preparation of an ever expanding group of products. A partial list of the uses for this versatile resin is on the right. If one of these applications is related to your product line, and you are not using LX-685, it might well pay you to write for literature or ask us for a sample. The Neville Technical Service Laboratory developed many of the present successful uses . . . perhaps it could help you too.

Present Applications:

Aluminum Paints, Brake Lining Compounds, Concrete Curing Compounds, Concrete Paints, Deck Enamels, Floor Paints, Gasket Stock—Oil Resistant, Gasoline and Grease-Proof Coatings, Gold Lacquers, Government Specification Coatings, Metal Coatings, Paper and Hardboard Impregnants, Pipe Coatings, Porch Enamels, Primers, Printing Inks, Shoe Soles—Cork Filled, Shoe Sole Compounds—GR-S, Slab Sole Stock, Traffic Paints

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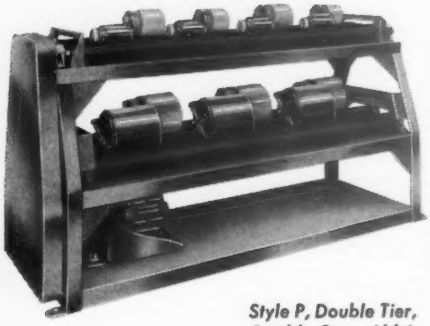
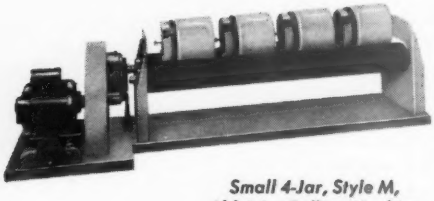
Handle Multiple Batches on Versatile abbé Jar Rolling Machines



Style P, Double Tier, Double Row, Abbé Jar Rolling Machine



Small 4-Jar, Style M, Abbé Jar Rolling Machine

Multiple batches of similar or different materials can be economically ground, pulverized or mixed simultaneously on a versatile Abbé Jar Rolling Machine.

Jars, bottles or containers of different sizes can be used at one time. Each jar can be removed after its full grinding or mixing cycle has been completed — without stopping the machine.

Modern, rugged Abbé Jar Rolling Machines are available to handle single or parallel rows of jars, and in double or triple tiers for processing as many jars as required. Standard porcelain or steel jars range in size from 1 quart to 6 gallons. Built-in storage cabinets on tiered machines are optional.

Write for New Abbé Jar Rolling Machine Catalog 79.
Address Dept. 64

abbé ENGINEERING COMPANY
50 Church Street, New York 7, N. Y.

HANNA

Fred J. Haniewich has been promoted to assistant vice president in charge of industrial finishes production, it was announced by Walter S. Hana, president of the firm.

F. Haniewich

Mr. Haniewich has been chief chemist of the firm's Industrial Division for the past 25 years.

He is a graduate of the Case Institute of Technology, and is a member of the Federation of Paint and Varnish Production Clubs. He was president of the Cincinnati, Dayton, Columbus, Indianapolis Paint and Varnish Production Club in 1940 and 1941.

HERCULES POWDER

Carl W. Eurenius, assistant general manager of the firm's Cellulose Products Department, was named assistant general manager of the Paper Makers Chemical Department, the company announced.

Werner C. Brown, director of sales for the Cellulose Products Department, will take over Mr. Eurenius' old post.

A graduate of Northeastern and Harvard Universities, Mr. Eurenius joined Hercules in 1942 as a member of the technical service staff of the Cellulose Products Department. He was director of sales for the Department before becoming assistant general manager in 1955.

Mr. Brown graduated from Duke University, joining the company's Research Center near Wilmington in 1942. where he held several supervisory posts before becoming assistant director of sales.

EMERY INDUSTRIES

Paul N. Leech has been appointed sales representative in the Mid-Atlantic sales territory, according to G. W. Boyd, sales manager of the Fatty Acid Sales Department.

Mr. Leech's territory includes central and northeastern Pennsylvania, northern New Jersey, western Maryland and central New York State. He will be responsible for Emery's line of fatty acids.

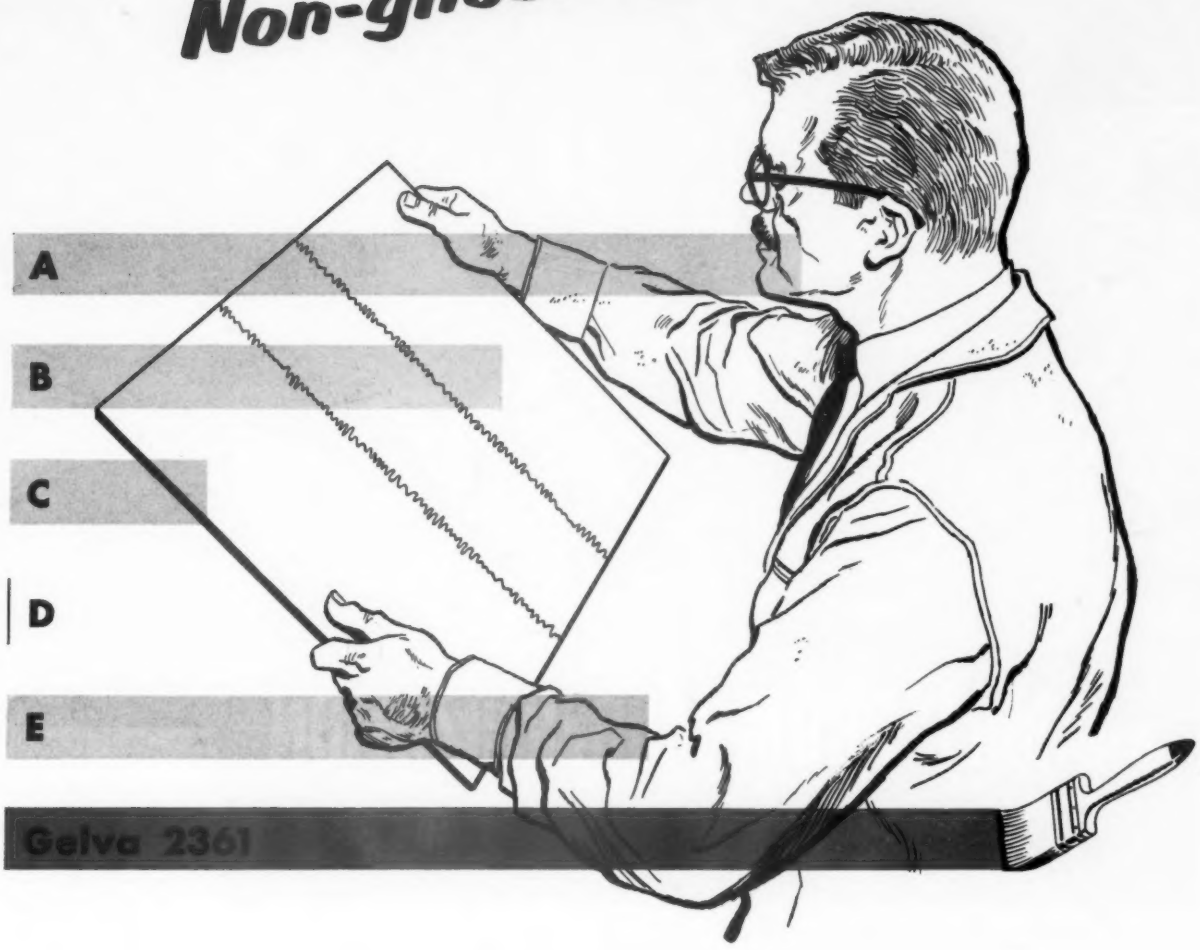
Prior to joining the firm, Mr. Leech was a sales representative for M&R Dietetic Laboratories in Toledo. He is a graduate of Northwestern University and a member of the American Chemical Society.

ADELPHI

Jack Sipp became an additional representative for the company's Baer Bros. division Industrial Finishes Division.

Mr. Sipp will service industrial accounts.

Non-ghosting



how Gelva base paints compare in tests with other types of interior paints

(one of a series)

Using standard test methods and assigned ratings on a scale from 10 to 0—good to poor, a typical GELVA paint formulation compares impressively in non-ghosting or absence of shading with commercial paints bought on the open market.

A represents a PVAc base paint
B represents a styrene butadiene base paint
C represents an acrylic base paint
D represents an alkyd base paint
E represents the average of eight paints tested
GELVA 2361 represents a Shawinigan PVAc paint formulation

This is factual evidence of extra value for paint manufacturers who use GELVA emulsions in their paints. Shawinigan's unequalled experience and continuing research are good reasons for specifying GELVA. For formulation data in booklet, "Gelva Emulsions for Paint," write Shawinigan Resins Corporation, Department 2203, Springfield 1, Mass.

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GELVA® *emulsions for paints*

SHAWINIGAN RESINS

How MILL ROOM MODERNIZATION Without Capital Expenditure

can INCREASE PAINT PRODUCTION

Today many paint plants are rearranging mill rooms to facilitate materials handling and speed production. Old fashioned mill rooms, poorly designed for materials flow, can be dangerously expensive in slowing production and increasing labor costs.

Patterson's experience and engineering "know-how" have proved highly profitable in developing the most practical rearrangement in many paint plants. Ceiling-suspended mills, as pictured, are but one of several mounting arrangements for more efficient mill operation.

If you contemplate modernization utilizing your present mills, why not call in a Patterson sales engineer today and discover how easily it can be done!

The Patterson Foundry and Machine Company

A Subsidiary of Ferro Corporation

East Liverpool, Ohio, U. S. A.

The Patterson Foundry and Machine Company, (Canada) Limited

Toronto, Canada

For the Paint and Varnish Industry: Grinding Mills . . . Linings and Grinding Media . . . Dispersers . . . Agitators and Mixers . . . Dissolvers . . . Synthetic Resin Systems

GLIDDEN

Louis Rich, Jr., has been appointed national defense coordinator for the firm's Paint Division.

L. Rich

Mr. Rich will represent the Glidden Co. to federal government agencies and will coordinate all activities in the fulfillment of direct government contracts. He will also prepare bids on direct government contracts, develop products and disseminate information on government specification materials.

A graduate of Colgate University and holder of a master's degree from the Harvard Business School, Mr. Rich was previously with the Arco Co., Cleveland, where he served in industrial and export sales.

EVANS RESEARCH

Five new members have been added to the firm's technical staff, according to an announcement by Dr. Eric J. Hewitt, vice president of the New York City independent chemical consulting laboratory.

Sylvia Fitzgerald, formerly of General Research Laboratories, and **Frances Helen Eidam,** formerly of Helena Rubenstein, are on the staff of research cosmetologists. **Jose Martin Fernandez, Martin H. Prescott III** and **Michael Argyros** are laboratory technicians.

GENERAL ELECTRIC

K. Jerry Morray has been appointed manager of the Cleveland Sales District of the Silicone Products Department.

Mr. Morray had been with the Cleveland sales office in 1950 and 1951. His most recent assignments have been sales and product planning specialist in the Chemical Materials Department, Pittsfield, Mass.

PATTERSON

Glenford M. Shibley has been appointed to the newly created position of assistant to the director of sales as part of a broad revision of the company's home office Sales Division.

Mr. Shibley recently joined the firm, coming from the Osborn Manufacturing Co. of Cleveland.

The following product group managers have also been named: **C. G. Keirnan,** Mixing and Drying; **J. E. Wright,** Size Reduction and Classification; **E. W. Stephenson,** Ceramics and Replacement Components, and **R. W. Campbell,** Process Systems.

In other appointments, **R. Jebens** became manager of Application Engineering, **R. B. Mack** was named manager of Customer Services, and **R. L. Custis** is manager of Advertising and Sales Promotion.

How to put greater
PROTECT-ABILITY
in your
Metal Protective Paints
Your customers demand the greatest protect-ability in paints they use for protecting bridges, railway signals, water towers, fire escapes, other steel structures and equipment including metal furniture. Give it to them!
Two Pure Black Iron Oxides
Try formulating with either of these two Pure Black Iron Oxides made by Williams for just this purpose. Both produce tough, non-porous, elastic films of unusually high protect-ability. Used in combination with either zinc chromate or red lead, they can be formulated to give metal protective paints of exceedingly long life.

For samples, ask your Williams representative or write us today for complete technical information. Address Dept. 23, C. K. Williams & Co., Easton, Pa.

Analysis of Williams Pure Black Iron Oxides B-247 and BK-250

$FeO + Fe_2O_3$	96.0% Min.
FeO	20.0% Min.
H_2O Soluble	0.5% Max.
Sp. G.	4.96
Fineness thru 325	99.5
pH Value	7-9
Avg. Diameter	0.4 microns

WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO. • Easton, Pa. • East St. Louis, Ill. • Emeryville, Cal.

108 Shades & Types of Iron Oxide Pigments, Chromium Oxides & Hydrates

CARBIDE AND CARBON

C. J. Kennett has become quality control statistician in the firm's South Charleston, W. Va., plant, it has been announced. He has a B. S. degree in Chemistry from the University of Virginia.

C. B. Lamb, B. S. in Chemical Engineering from the University of Pittsburgh, was appointed quality control co-ordinator at the same plant.

The company also announced eleven new appointees to the technical organization of the Development Department at the South Charleston plant.

They are: **Benny Greco,** B.S. in Chemistry, W. Va. Tech; **P. H. Miller,** M.S. in Chemistry, U. of Miss.; **G. B. Elder,** B.S. in Chemistry, Penn State; **Virginia D. Kuykendall,** B.S. in Chemistry, W. Va. U.; **Ola M. Riley,** B.S. in Chemistry, Seton Hill College, and **D. O. Daley,** B.S. in Chemical Engineering, Clarkson College of Technology.

Also, **T. E. Kennell,** B.S. in Chemical Engineering, Notre Dame; **B. L. Connelly,** B.S. in Chemical Engineering, Catholic U.; **R. A. Mussey,** B.S. in Chemical Engineering, U. of Va.; **A. C. Oberton,** M.S. in Sanitary Engineering, M.I.T., and **D. H. Ashmus,** M.S. in Chemical Engineering, Purdue.

GENERAL MILLS

Dr. Albert J. Milun was promoted to leader of the Analytical Research Section of the firm's Research Laboratory, it has been announced.

Dr. Milun was a research chemist at the du Pont Laboratory before joining the General Mills research staff. He received a Ph. D. in Chemistry from the University of Wisconsin in 1951.

In another General Mills change, **William J. Ward** was appointed leader of the Research Laboratory's Special Projects Section in the Chemical Engineering Department.

Mr. Ward was with the Wyeth Institute in Philadelphia before joining the company's staff in 1947. He is a graduate of Villanova College.

GLIDDEN

Howard A. Shelley, Jr., is the new industrial sales manager in the company's paint division Los Angeles district, it has been announced.

Mr. Shelley has been with the firm since 1949, serving in the central division technical service department, and as central division assistant sales manager. He was national defense coordinator for Glidden before his recent assignment.

He graduated from Case Institute of Technology and received a master's degree in business administration from Harvard University.

The company has also announced three appointments in the Cleveland paint division.

John H. Lathe, Jr., is now field manager of trade sales, **W. G. Wickham** was appointed director of branches, and **William D. Kinsell, Jr.,** was named merchandising manager.

ARCHER-DANIELS-MIDLAND

John K. Lilly and **Ronald W. Bonatz** have been appointed technical sales representatives for the Chemical Products Division, it was announced by John D. Hetchler, sales manager of the Division.

Mr. Lilly will cover the Cleveland, Buffalo and Pittsburgh areas. He is a graduate of Princeton University and a member of the American Chemical Society, Cleveland Paint, Varnish and Lacquer Assoc., Chicago Drug and Chemical Assoc., and the American Marketing Assoc.

Mr. Bonatz will operate in the Michigan, Indiana and Toledo areas. He was a Chemistry major at the University of Michigan, and joined the firm in 1955 as a chemist at the Wyandotte, Mich., plant. He previously held technical positions at Ford Motor Co. and Doss Steel Research, and was with the University of Michigan's Engineering Research Institute.

PECORA PAINT

Walter F. Strobel, formerly in charge of purchasing, has been appointed vice president in charge of production, it was announced by H. Wesley Hibbert, executive vice president.

Mr. Strobel, a native of Philadelphia, has been with the firm for 33 years.

If you haven't drawn upon the skilled assistance of the Nopco paint chemists in eliminating *foam*...you are missing an excellent chance to improve your product.

For there is a close relationship between these two facts: (1) Nopco's 50 years of chemical research and extensive practical knowledge in working on paint production problems. (2) Nopco produces more anti-foamers than any other supplier.

All our experience shows that no one anti-foamer works equally well for all systems—or even for different makers using the same system. (In fact, maximum foam reduction often is obtained by blending several anti-foamers.)

And since Nopco has been called in to help many plants, we have formulated new anti-foamers as they were needed—until today we have a complete line, both paste and liquid. If you would like to investigate the possibilities of a more efficient, more economical anti-foamer in your product, we would be happy to work with you. Just drop us a line. Nopco Chemical Company, Harrison, N. J.

Write for booklet listing Nopco's complete line of anti-foamers and paint additives.

1907–1957 50 Years of Progress in Chemistry

NOPCO

PLANTS: Harrison, N. J.
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Richmond, Calif.
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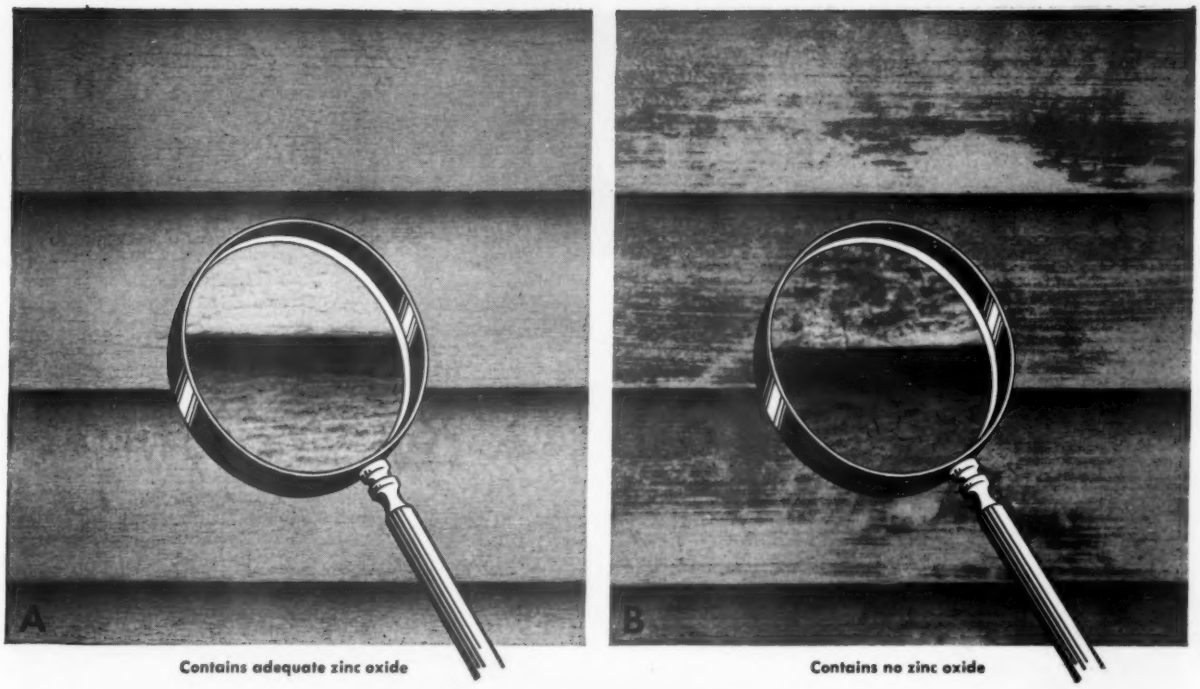

Contains adequate zinc oxide

Contains no zinc oxide

Are you using enough ZINC OXIDE for

GOOD DURABILITY?

The above two clapboard sections, each coated with a linseed oil base exterior paint, were weathered for several years on a test fence in Eastern U. S. A., where erosion failures are common.

The difference: Paint A contains adequate zinc oxide content – Paint B contains *no* zinc oxide.

This test – and others made under widely varying conditions of climate and exposure – demonstrate that resistance to erosion, as well as good self-cleaning action, depends on adequate zinc oxide content. The unretouched photos above clearly show the characteristic film integrity of high-ZnO paints.

The qualities imparted to any good paint by adequate quantities of zinc oxide are well known . . . and time-proved. In balancing a formulation, zinc oxide levels must be kept high to insure customer satisfaction. With this in mind, consider:

Are you formulating your paints for maximum possible quality?
Are you formulating your paints with enough zinc oxide?

ENOUGH ZINC OXIDE GIVES YOUR PAINT . . .

- **DURABILITY**
- Mildew resistance
- Opacity to ultra-violet light
- Tint retention
- Self-cleaning action

Technical reports are now being prepared by member laboratories of AZI on the benefits of proper zinc oxide usage. To receive copies of these reports, mail coupon.

AZI

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Please send me future reports on paint formulation findings.

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McDANEL SUPER HIGH DENSITY MILL LININGS with a specially-developed body give more production at less cost!

● The first thing you notice about McDanel Super High Density Mill Lining Brick is its pure whiteness, its smoothness. During installation it's easy to work with. Special shapes fit quickly and easily around mill doors. Mill ends fit tighter, neater.

● When grinding begins you know you've got a superior mill lining, because McDanel Lining Brick is made from a special, scientifically developed body under constant manufacturing control. Lasts up to three times longer with big savings in costs and less down time.

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BEAVER FALLS · PENNSYLVANIA

Send for Bulletin B1-56 with the latest information on McDanel Mill Lining Brick and Grinding Balls. Do it now!

PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Coating Stabilized With Cyanoethylated Protein

U. S. Patent 2,775,565. Leonard L. McKinney, John C. Cowan, and Cyril D. Evans, Peoria, Ill., assignors to the United States of America as represented by the Secretary of Agriculture.

A coating composition comprising butadiene-styrene latex as the vehicle emulsified in a continuous aqueous system containing as an emulsion stabilizer, a stabilizing amount of cyanoethylated protein, said composition being in a stable and preserved condition in that its storage life—the period during which it maintains its original condition without gelation, without separation of the emulsifiable substance, and without spoilage of the emulsion stabilizer—is at least twice that of a composition formed of the same emulsifiable substance emulsified in a continuous aqueous system containing as an emulsion stabilizer, the same protein but free from cyanoethyl groups.

Evaluating Polymerized Vinyl Chloride Systems

U. S. Patent 2,773,746. Harold A. Reehling, Lancaster, Pa., assignor to Armstrong Cork Co., Lancaster, Pa., a corporation of Pennsylvania.

The method of testing the stability against heat and light degradation of a resinous system containing as an ingredient thereof a polymerized vinyl chloride, which method comprises incorporating ultramarine blue in said system, exposing the resulting mixture to degradation conditions, and estimating the degree of stability of the system by the color change of the exposed mixture.

Rosin and Rosin Size Stabilized Against Crystallization

U. S. Patent 2,776,275. Edward Strazdins, Stamford, Conn., assignor to American Cyanamid Company, New York, N. Y., a corporation of Maine.

A rosin stabilized against crystallization by a uniformly distributed small amount of the condensation product of a rosin with a saligenin, said saligenin being an aryl compound carrying a hydroxy group and a hydroxymethyl group in adjacent position.

The man who needed a specialist!

With a throbbing head and uneasy stomach, the P.A. stopped for succor at the plant dispensary. Grumbled to the doc about his problems until he was told, "You need a specialist!"

The P.A. almost strangled on the aspirins he was swallowing. But the doc went on to explain that he didn't mean another M.D., but a company that specialized in tall oil products . . . one that could eliminate the P.A.'s frustrations in trying to get good service.

It turned out that we were the prescription, for the P.A. found that Arizona supplies tall oil derivatives *exclusively*. Months later, he stopped in at the dispensary again . . . but just to tell the doc that it was the best "diagnosis" he'd ever had!

All of Arizona's efforts are devoted to producing ACINTOL* Tall Oil Products and ACINTENE* Terpenes. Buyers benefit from this specialization, for it assures a knowledgeable service that reduces purchasing problems.

*Registered trademark

Arizona

CHEMICAL COMPANY
(INCORPORATED)
30 Rockefeller Plaza, New York 20, N. Y

World's largest supplier of chemicals based on tall oil

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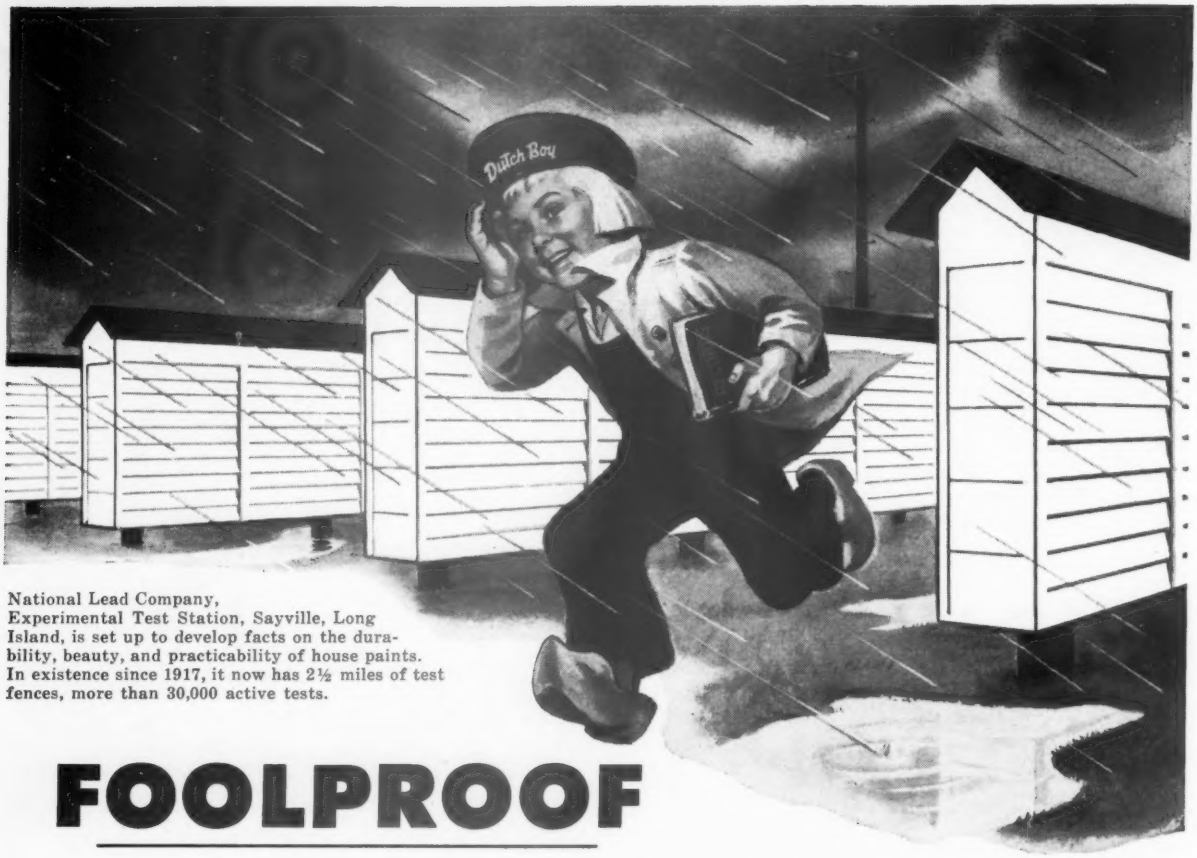

National Lead Company, Experimental Test Station, Sayville, Long Island, is set up to develop facts on the durability, beauty, and practicability of house paints. In existence since 1917, it now has 2½ miles of test fences, more than 30,000 active tests.

FOOLPROOF

your exterior paints with Dutch Boy® "45X"

(Basic Silicate White Lead)

Chances are you already know that lead gives exterior paints uniform performance. Leading paint makers have agreed on this for years.

But you may not know that Dutch Boy Basic Silicate White Lead "45X" does this with new efficiency, new economy. Thousands of exposure panels at National Lead's Sayville Experimental Test Station prove this.

Take *white* House Paints. "45X", Sayville shows, improves self cleaning yet preserves film integrity.

Take *tinted* House Paints. "45X" helps maintain color uniformity, increases film durability.

Take Primers . . . or Porch and Floor Enamels. When you add Dutch Boy "45X" to your exterior paints, you build up key properties . . . build in *uniform* performance.

Fewer Complaints

Those you hear! Those you don't! Both go down, you'll find. You save time and cost of adjusting complaints. Repeat business comes easier, at less expense.

Cost goes down, too. In each "45X" pigment particle, reactive portion is at the surface . . . making proportionately larger amounts of lead available in each pound.

Fewer complaints! Lower cost! No wonder it pays to put Dutch Boy Basic Silicate White Lead "45X" in your exterior paints.

NATIONAL LEAD COMPANY, 111 Broadway, New York 6, N. Y.
In Canada: **CANADIAN TITANIUM PIGMENTS, LIMITED,** 630 Dorchester Street, West · Montreal

Rosin Hydrogenation

U. S. Patent 2,776,276. Arthur L. Glasebrook, Alfred N. Hoffman, and James B. Montgomery, Wilmington, Del., assignors to Hercules Powder Company, Wilmington, Del., a corporation of Delaware.

The process which comprises subjecting a material containing a compound selected from the group consisting of rosin acids, esters of rosin acids, alcohols produced by the reduction of the carboxyl group of a rosin acid, and esters of said alcohols to treatment with hydrogen at a temperature of from about 125° C. to about 300° C. and a pressure of at least 3000 p. s. i. g. in the presence of a noble metal catalyst selected from the group consisting of palladium, rhodium, and ruthenium and continuing the treatment with hydrogen until a substantially completely hydrogenated product is produced.

Emulsion Paint

U. S. Patent 2,778,740. Ralph Sterling Armstrong, East Chicago, Ind., assignor to The Sherwin-Williams Company, Cleveland, Ohio, a corporation of Ohio.

An emulsion coating composition characterized by its capacity to tolerate calcium sulfate ions without emulsion break-down upon application consisting of a continuous aqueous phase, a discontinuous oil phase and a pigmentary solid phase; said aqueous phase consisting essentially of a fluid colloidal solution of water soluble cellulose derivatives characterized by their aqueous gel forming quality at low solids concentrations and at least one salt-free organic nonionic detergent of molecular weight above 550 containing a plurality of oxyalkylene units of not more than 3 carbon atoms each and a hydrophobic organic group containing at least 8 carbon atoms wherein said oil phase consists essentially of a non-volatile oleoresinous varnish vehicle of low acid value and said pigmentary phase comprises calcium sulfate containing pigment.

Elimination of Haze From Finishes

U. S. Patent 2,778,741. Ira Weber, Long Island City, N. Y., assignor to Interchemical Corporation, New York, N. Y., a corporation of Ohio.

The method of producing a transparent colored film of organic film forming material free of haze, and containing a fluorescent dyestuff which would normally produce haze in the film, which consists in adding to the composition used for producing the film, a small amount of a colored heavy metal salt soluble in the film forming composition and selected from the group consisting of salts of iron, cobalt, nickel and copper.

Dry Tall Oil Rosin Size Compositions

U. S. Patent 2,776,221. Edward Strazdins and Randall Hastings, Stamford, Conn., assignors to American Cyanamid Company, New York, N. Y., a corporation of Maine.

A storage-stable dry tall oil rosin size in homogeneous free-flowing particulate form consisting essentially of 1 part of a substantially neutral alkali metal salt of partially disproportionated tall oil rosin having a specific rotation between about +25° and +45°, ½ to ¼ part by weight of a substantially neutral alkali metal salt of a maleated rosin, and about 0.1% to 1% of a nitrogen-containing rosin size antioxidant selected from the group consisting of diarylamines and phenothiazines based on the weight of unmaleated rosin present.

LANCASTER, ALLWINE & ROMMEL
REGISTERED PATENT ATTORNEYS

•

Suite 424, 815 — 15th St., N. W.
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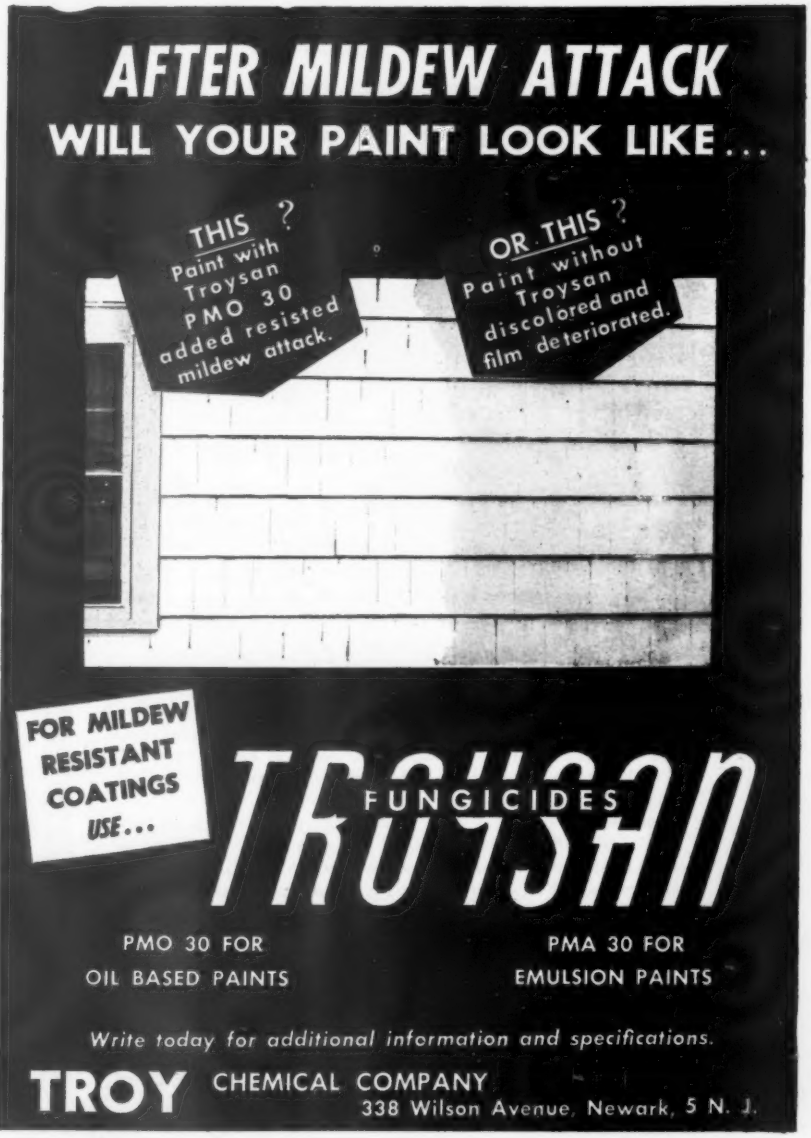
Patent Practice before U. S. Patent Office. Validity and Infringements Investigations and Opinions.

Booklet and form "Evidence of Conception" forwarded upon request.


AFTER MILDEW ATTACK
WILL YOUR PAINT LOOK LIKE...
THIS ?
Paint with Troysan PMO 30 added resisted mildew attack.
OR THIS ?
Paint without Troysan discolored and film deteriorated.
FOR MILDEW RESISTANT COATINGS USE...
FUNGICIDES
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Write today for additional information and specifications.
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abstracts

Oxygenated Solvents

by G. Bach; Peintures-Pigments-Vernis, vol. 32, No. 6, pp. 515-524.

The author first deals with the general classification of the organic oxygenated solvents and their broad characteristics. They can be classified into: alcohols, glycols and the polyglycols; the ethers and the glycol ethers; the ketones and the aldehydes; finally the esters. The general physical characteristics of this broad group of oxygenated solvents are then dealt with. In particular the important aspect of polarity is discussed in detail. The author deals at length with the notion of polarity, what it means and how this characteristic varies according to the nature and composition of the oxygenated solvent. The effect of polarity on the behavior of the solvent and of the lacquer formulated with these polar solvents is then discussed.

Subsequently, the various oxygenated solvents in common usage in the lacquer industry are dealt with in detail, from the aspect of their preparation and main characteristic properties. On this basis, the author discusses isopropyl alcohol, acetone, diacetone alcohol, methylisobutyl ketone, secondary butyl alcohol, methyl ethyl ketone, ethyl alcohol and n-butyl alcohol, ethyl acetate, isopropyl acetate, n-butyl acetate, ethyl-glycol acetate (cellosolve acetate), ethyl lactate. The specific applications and their functions of these individual solvents together with their behaviors in lacquer formulations are also given in detail.

With the aid of detailed graphs, a comprehensive study is presented, particularly from the standpoint of defects in lacquer formation and application and the prevention of these troubles.

A study of the solvent power shows that for the nitrocellulose lacquers, for a given viscosity, 8% of nitrocellulose can be dissolved in butyl acetate as against 5% in methyl ethyl ketone. Broadly, the ketones have a solvent power which is higher than the esters having similar physical properties. The ketones have also a higher solvent power than the esters for numerous resins.

The resistance to blush was investigated. The lacquers investigated were composed of a solvent containing 45% toluene, 15% of isopropyl alcohol and 40% of active solvent constituted by variable proportions of methyl ethyl ketone and methyl isobutyl ketone. It was found that the permissible degree of atmospheric humidity decreases with the proportion of methyl isobutyl ketone in the mixture.

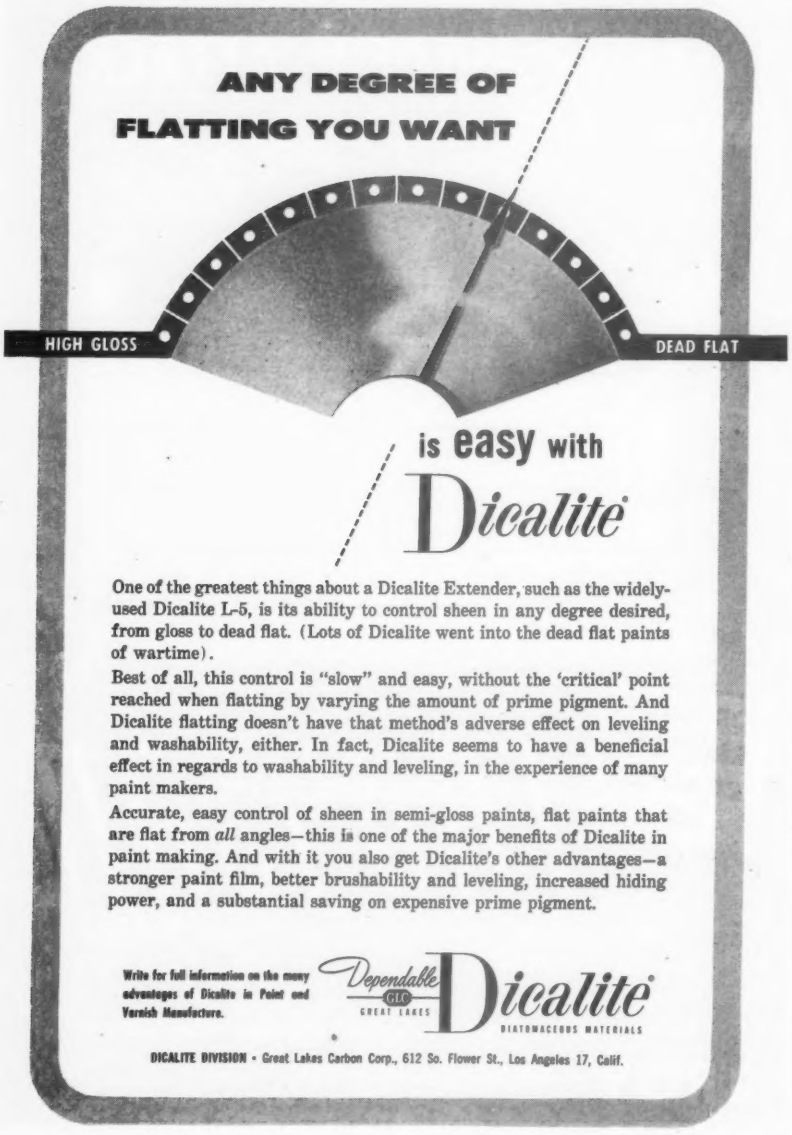
Suspension Mediums For Water Paints

by J. Baker; Paint Manufacture, vol. 26, No. 1, pp. 23-24. (G. Britain)

The manufacturers of water paints have encountered in recent years, an increasing competition on the part of varnish paints of matt alkyd resins, of emulsion paints and of matt oil paints.

However, by virtue of their advantages due to the facility of application, to their low price and to the fact that they do not require expensive diluents, they have not only maintained their position on the local market but have even found the means of entering the export market.

The author then gives details of the formulas developed for water paints intended for the export market. Emphasis is on paints based on casein and the mixtures to be realized to obtain paints resistant to mould growth.


ANY DEGREE OF
FLATTING YOU WANT
HIGH GLOSS
DEAD FLAT
is easy with
Dicalite
One of the greatest things about a Dicalite Extender, such as the widely-used Dicalite L-5, is its ability to control sheen in any degree desired, from gloss to dead flat. (Lots of Dicalite went into the dead flat paints of wartime).
Best of all, this control is "slow" and easy, without the 'critical' point reached when flatting by varying the amount of prime pigment. And Dicalite flatting doesn't have that method's adverse effect on leveling and washability, either. In fact, Dicalite seems to have a beneficial effect in regards to washability and leveling, in the experience of many paint makers.
Accurate, easy control of sheen in semi-gloss paints, flat paints that are flat from all angles—this is one of the major benefits of Dicalite in paint making. And with it you also get Dicalite's other advantages—a stronger paint film, better brushability and leveling, increased hiding power, and a substantial saving on expensive prime pigment.
Write for full information on the many advantages of Dicalite in Paint and Varnish Manufacture.
Dependable GLC GREAT LAKES
Dicalite
DIATOMACEOUS MATERIALS
DICALITE DIVISION • Great Lakes Carbon Corp., 612 So. Flower St., Los Angeles 17, Calif.

Customer confidence is built on the high chalk resistance and durability of

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Study of Rust Protective Paints

by M. Tarbouriech; Peintures-Pigments-Vernis, vol. 32, No. 6, pp. 506-514.

Natural aging and accelerated weathering tests constitute two important means in the technical study of the anti-rusting protective paints. The long term, natural aging test has a serious disadvantage which is the undue length of the test time required for final conclusive results. The second, short-term accelerated test method gives more rapid results but results which are less certain than with the first test method. Some examples given show how the different elements of the paint film intervene in the anti-rusting protection. As regards natural aging tests by long term weathering exposure it has been found that the results obtained from this permit standardization of the accelerated aging test.

The objective of the present work has been to show how a method based on natural observations permits the detailed study of anti-rusting paints. Brief details are given of the natural exposure weathering tests to which were co-ordinated aging tests conducted in the laboratory.

Over a period of four years, tests were conducted on a number of systems of anti-rusting paints exposed outside and in the laboratory. These paints which were specially selected by various manufacturers, all gave very satisfactory results with the laboratory tests. Observations here did not permit eliminating the less satisfactory and it is considered that this could only be done at the end of several more years test.

A first experience obtained, covering external building work paints on various sub-surfaces and particularly on steel provides the following classification based on the film forming agent.

Paints of crude linseed oil;

Paints based on drying oils which have been subjected to special treatments such as cooking;

Fatty oil enamel paints modified by the addition of resins;

Paints of chlorinated rubber.

Factually, this classification is incomplete because certain categories of paint are not mentioned in this and moreover, the role of the pigments has not yet been entirely unravelled because of their diversity.

It was found possible to classify according to weather exposure. Dry climatic conditions are the least unfavorable to paints. There follow in order non-acid rural atmospheres, then in order of increasing aggressiveness, non-marine industrial atmospheres charged with acid vapors, port installations comprising also acidity, vapors emanating from the sea and finally, tropical atmospheres combining heat, humidity, saline mist and even in certain cases, acid fumes.

This is the reason why the laboratory study was not limited to one standard accelerated aging but to three principal types details being given in the text of these.

It is realized that the value of accelerated aging tests is still very disputed. However, it is intended that this work will stimulate interest in this method of paint testing, which is in its infancy.

Sodium-Carboxymethylcellulose

Anon., Peintures-Pigments-Vernis, vol. 32, No. 4, pp. 299-300.

The continuous manufacture of sodium carboxymethylcellulose is generally conducted by the treatment of alkali cellulose with sodium chloracetate. The pure sodium carboxymethylcellulose is obtained as an odorless white powder which is soluble or dispersable in water or in alkaline solutions. It is compatible with numerous organic compounds likewise soluble in water. The polyhydric alcohols such as glycerol, glycol, sorbitol are good plasticisers of sodium carboxymethyl cellulose films.

The various uses of sodium carboxymethylcellulose result from its hydrophilic character, from the high viscosity of its diluted solutions, from its filming properties and its characteristics of protective colloid and adhesiveness. The sodium carboxymethylcellulose finds use as a dispersing and thickening agent with emulsion paints and in the manufacture of printing inks.

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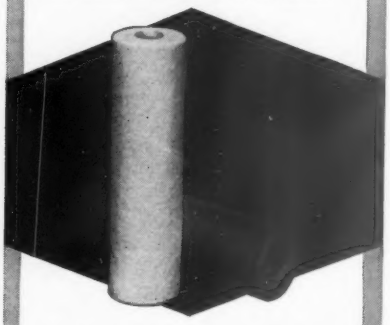

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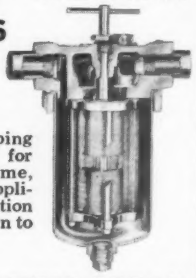

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Wrinkle Finishes

by F. Margival, Peintures-Pigments-Vernis; vol. 32, No. 4, pp. 314-315.

Among the decorative lacquer finishes, the wrinkle finishes find by far the largest use; apart from the pleasing effect obtained another important advantage is that a better protection is offered to the metal covered, as there are no weak points by which moisture can penetrate. In addition, a better hold of the film is obtained as the surface irregularities impart a remarkable elasticity. While previously, the wrinkle could only be made with thick coatings, at the present time this can be achieved with thin coatings and with considerable variation of appearance. Apart from the pure wrinkle finish, marbled effects are obtained.

When suitably applied the following characteristics are obtained from a good wrinkle finish. There is sufficient hardness and a uniformity of surface relief whatever the pigment employed. The finish has covering power as regards pits or fissures and the baking can be conducted at reasonable temperatures of 95° to 120° C. The finish is insensitive to small variations of application conditions and the relief effect obtained is constant whether the varnish coating is thin or thick. The finish also has a suitable viscosity permitting of spray gun application.

The conditions which it is necessary to conform to to obtain a good quality wrinkle finish can be summarized as follows. An over-polymerisation of the resins or oils should be avoided; the least possible amount of cobalt or manganese driers should be used; a large proportion of high boiling point solvents should be used; stabilizers such as lithopone, zinc or titanium oxides should be added to give regular wrinkles; fine textured wrinkles, of a "suede" appearance are obtained by the incorporation of colloidal pigments, the particle size being less than one tenth of a micron.

The wrinkling tendency can be improved by conducting the drying in a special atmosphere-ozonised air or a mixture of air and nitrogen peroxide. Phenol resins can be replaced by urea or melamine resins and this leads to simultaneous improvement both in the hardness and the flexibility.

Solvents for Nitrocellulose Lacquers

by H. W. Rudd; Paint Manufacture (G. Britain), vol. 25, No. 9, pp. 335-341.

Former practice in this field has been to often compare the esters and the ketones according to their physical properties. This method is insufficient for in the majority of cases, mixtures of five to six solvents are employed.

The author studied, in particular, the evaporation curves of the usual solvents and of mixtures of solvents. In addition, the solvent power for nitrocellulose was determined. The viscosities of the cellulose solutions were ascertained in various solvents and mixtures of solvents. The flow of the solutions obtained with various solvents was finally studied.

Thixotropic Alkyd Resins

by A. G. North; Paint Technology (G. Britain), vol. 19, No. 219, pp. 409-410.

Several means are available for obtaining thixotropy. The first is the pigmentation which is only usable for matt finishes and is limited to colors that can produce the desired effect.

The second method consists of adding aluminium stearate or an oxidized rubber and this method can be employed for matt paints or for primer paints.

The third method consists in the utilization of thixotropic alkyd resins. The author then gives details of the special methods to be utilized for the employment of these alkyds, in particular for their heating and their mixing.

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Chemical Analysis Of Synthetic Resins

by C.P.A. Kappelmeier; Fette-Seifen-Anstrichmittel, vol. 57, No. 4, pp. 229-230.

The method developed by the author permits of the analytical examination of various types of synthetic resins including the urea and alkyd resins. The method permits also of identifying the poly-alcohols present in the latter.

The procedure in most current use at he moment is based on the saponification of the ester groups present, by alcoholic potash. Another method used which often gives good results is based on the alcoholysis of the synthetic resin being examined by methyl alcohol with the addition of an appropriate catalyst. The acids present in the synthetic resin are transformed into their methylic esters while the upper alcohols are freed.

With these methods, both by saponification and also by the alcoholysis, reaction products are obtained from which the upper alcohols cannot generally be separated and can no longer be estimated simply. However, this separation and estimation can be conducted fairly easily by aminolyse, this comprising the ester groups present being reacted with ammonia or amines. There is thus recovered the total amount of the mono- and dicarbonic acids present in the form of the corresponding amides or their derivatives, together with the alcohols freed. The reaction of the aminolyse is produced according to the equation:

$$R_1COOR_2 + X \cdot NH_2 \rightarrow R_1CO \cdot NHX + R_2OH$$

This auxiliary technique of aminolyse has as yet found hardly any application but the experience of the author has shown that interesting research results can be expected when it is applied.

A little known example of the aminolyse method is the decomposition of the urea resins with the aid of aniline of benzylamine or other higher amines. It is obviously here not a question of the same reaction mechanism as in the case of the degradation of esters by aminolyse. It is the obtaining of certain derivatives of urea which render possible the characterization and ultimately the estimation of the aminoplasts, of the urea resins in particular. For example, all the urea resins are transformed by the method of Kappelmeier and Van Goor by boiling with aniline, benzylamine or another aromatic or aliphatic base, into symmetrical disubstituted ureas, easily identifiable by their fusion point. The decomposition takes place quantitatively with benzylamine or beta-phenylethylamine in such a way that one can determine, starting from the weight of the urea derivative, the approximate quantity of the urea resin existing in a mixture.

The degradation of the alkyd resins can be employed in the following manner. It has been observed that by heating with the betaphenylethylamine ($C_6H_5 \cdot CH_2 \cdot CH_2 \cdot NH_2$), the alkyd resins decompose quantitatively into amides of the fatty acids and the dicarbonic acids corresponding and into polyalcohols. It is thus that one can separate with a relative facility, from other constituents of a phthalic resin based on linseed oil and pentaerythritol, the glycerine and the pentaerythritol which it contains and subsequently, estimate these. Full details are given in the text of the research and, estimation of the pentaerythritol in the alkyd resins.

Applying the method to the research of the glycerine, the following can be said. In the complete analysis of an alkyd resin it is often desirable to determine, at least qualitatively, the presence of glycerine, apart from the pentaerythritol. This is conducted very simply as follows. The glycerine, separated by aminolyse passes in the filtrate with the chloroform, during the filtration of the pentaerythritol. If this filtrate is agitated with water, in a decantation flask, one can detect the presence of glycerine in the aqueous layer by the known reactions:

An aqueous solution of boric acid is made slightly alkaline and a drop of phenolphthaline solution added. The liquid which is obtained is slightly rose colored and if there is added to this a part of the aqueous extract of the chloroformic filtrate, previously concentrated by evaporation, this being neutral or similarly rendered slightly alkaline, the pink coloration disappears immediately in the presence of the glycerine, because as is known, the

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glycerine forms strongly acid complexes with the boric acid.

Another proof of the presence of glycerine is furnished by the following test. Some drops of a copper sulfate solution and an excess of soda lye are added to one part of the concentrated aqueous extract. The presence of glycerine is manifested by the appearance of an intense blue coloration.

The following details are given of research on the other poly-alcohols in alkyd resins. For some years in alkyd production, in addition to glycerine and pentaerythrite, there has been encountered a whole series of other poly-alcohols such as for example, trimethylolpropane and trimethylolethane. Efforts to isolate similarly a trimethylol-combination by aminolyse proved fruitless. It is thought that this can be attributed to the fact that the trimethylol combinations in question have a fusion point distinctly lower than pentaerythritol. They accordingly do not crystallize in the mass but remain dissolved in the glycerine (which originates most often from the oil used in the manufacture of the alkyd resins. It is necessary also to take due account of the presence of ethylene glycol and of other glycols. These are similarly dissolved in the glycerine or the water after treatment, if present in the alkyd resin. The analysis of such a mixture could be ensured if this were absolutely necessary, probably by the oxidation of the poly-alcohols with the aid of periodate of potassium.

Regarding investigation of the pentaerythritol, this can unfortunately not be isolated by aminolyse with the beta-phenylethylamine as simply as in the case of the alkyd resins, when it is a question of resin esters and of maleic resins, esterised with pentaerythritol. At the boiling point of the amine (195° C.) the aminolyse has apparently not yet taken place or at least, not sufficiently. If it is considered that all the esters of the resinous acids of colophony are only saponifiable with difficulty, it will be appreciated that the aminolyse of these esters is surrounded with difficulties. Up to the present no amine has been found which permits of resolving this problem of chemical analysis.

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New Painting Cycle For Ships Bottoms

by L. Colombo; Ind. Vernice (Italy), vol. 9, No. 5, pp. 123-125.

Comparative painting tests were made on a ship's bottom which was divided into various zones. On the first "control test" zone, there was applied the normal cycle of six coatings; on the second zone (8 vertical bands, cycle a) the subsequent treatment of four coatings was applied: 1 chemical treatment, 2 coatings anti-corrosion, 1 coating anti-fouling. The third zone (two vertical bands, cycle b) received five coatings: 1 chemical treatment, 3 coatings anti-corrosion, 1 coating anti-fouling. The fourth zone (1 horizontal band, cycle c), situated immediately below the minimum water line received an application of 6 coatings: 1 chemical treatment, 3 coatings anti-corrosion, two coatings anti-fouling.

The examination of the results obtained, notably regarding the density of the fouling growth which appeared subsequently on the various treated surfaces, showed that from the actual facts, the cycle *b* with five coatings produced the best all round results with the minimum of expense.

Rust Inhibitors in Paints

by J. Patterson; Chimie des Peintures, vol. 18, No. 9, pp. 314-316.

Up to the present moment, red lead has been considered as the best rust inhibitive pigment which can be utilized for the protection of the ferrous metals.

One can however visualize that in the future, the organic inhibitors will assume a greater place in this field.

Among these there can be cited the following, which by virtue of their electrolytic properties, present interesting possibilities for rendering mineral oils or paints inhibitive.

These are hydrocarbons possessing polar groups; alcoholic esters of dibasic acids; diamines of saturated fatty acids; tertiary diamines; derivatives of benzoic acid; morpholine.

The value of an organic product as an anti-rusting inhibitive agent can be determined by measuring in an immersed medium, the electrical impedance of the paints.

Catalysis of Auto-Oxidation Of Non-Saturated Compounds

by W. Kern and H. Willersinn; Angewandte Chemie, vol. 67, Nos. 19-20, pp. 573-581.

So as to obtain a better understanding of the formation of films from drying oils, the authors studied the auto-oxidation of methyl linoleate which appeared as being an auto-catalytic reaction, the speed of auto-oxidation being proportional to the quantity of oxygen already consumed.

The auto-catalysis appears to be produced by the intermediary of hydro-peroxides. In the catalysis caused by the metallic compounds (Cu^{++}, Fe^{+++},) the metallic catalyser activates neither oxygen nor the linoleic ester, but leads to the formation of free radicals from the hydro peroxide of the linoleic ester. It is a question simply of an acceleration of the auto-catalysis. These results show that it is possible, with the aid of the Redox system or of a system metal-Redox, to strongly catalyze the auto-oxidation. The study of the oxidation of a fatty acid with double conjugated bonds, reveals it to be much more complex than that of a non-saturated fatty acid with a single double bond.

Stability of Lacquers Based on Bronze Powders

by W. F. Daggett; Paint Technology, vol. 19, No. 216, pp. 299-300, (G. Britain).

It is known that bronze powders cause the gelling of nitrocellulose varnishes. Quite often, this is a matter of some hours. Similarly, the bronze powders have the property of coloring certain filming agents, green.

It has been stated that cellulose acetobutyrate will permit the production of finishes with bronze powders, which are stable and do not gel.

A certain number of tests were conducted by the author to ascertain what happened. It was confirmed that the usual components of cellulose varnishes cause gelation but that there is no action on the green coloration. The addition of a small quantity of an acid resin causes the discoloration of the filming agent. The author finally conducted tests with different solutions of ethyl cellulose.

Evaporation of Binary And Ternary Mixtures of Solvents

by P. D. Wright; Journ. Oil and Color Chemists Association (G. Britain), vol. 39, No. 2, pp. 129-146.

The majority of the nitrocellulose lacquers as well as other finish coating products, are based on binary or ternary mixtures of volatile constituents: solvents, diluents, each having a particular speed of evaporation, and it is particularly important to know the composition of the volatile phase remaining after an evaporation of 80 to 90%. This corresponds approximately to the "dust free" stage of a lacquer varnish or of an enamel paint.

The variation in composition of a binary or ternary system of solvents can be studied very easily, according to a standard procedure and little difference is noticed in the evaporation ratios concerning simple mixtures of solvents or of solutions of resins, up to 80% evaporation. The total departure of solvents from a solution is never attained even at the end of 5 to 6 hours of drying. One generally attains an almost constant level, corresponding to a fraction of 6% of solvents, remaining in the test pieces.

Stearates for the Paint Industry

by M. L. Stumpf; Paint Manufacture (G. Britain), vol. 25, No. 12, pp. 453-458.

The metallic stearates occupy a place which is assuming ever greater importance in the paint industry and according to their particular characteristics, various specialized applications are found for them. They are easy to prepare, relatively inexpensive and are easily stored when humidity is excluded.

There can be cited in particular the stearates of: aluminium, which is a gellying and suspension agent; ammonium, which is an impermeabilising agent; cadmium, which is used as a stabiliser of the vinylic resins; iron and lead, used as lubricants; zinc, to obtain matt paints, various others which are utilized as catalysts, stabilisers, emulsifiers etc.

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Phenomena Between Primer Coating and Metal Sub-Surface

by B. Waeser; Deutsche Farben Zeitschrift, vol. 9, No. 8, pp. 296-301.

Between the sub-surface and the coatings applied for the protection of metal, various diverse phenomena occur, some of which overlap, others being separate in their nature and effect. The present study covers only one part of this wide field of research and is concerned with the interface behavior of paints on ferrous metal surfaces. The study can be regarded as serving as an introduction to a treatise on protection against rust which the author intends to publish in the near future.

Opinions held on the fundamental phenomena, both physical as well as chemical, are still greatly diversified. The author considers that a satisfactory theory can only emerge by the grouping of many individual observations and it is with this object in view that details are published in the present matter of the results of his own personal observations, which have extended over many years.

Analysis of Drying Oils

by S. R. Ramachandran and R. S. Prayag; Paintindia, vol. 5, No. 7, pp. 33-35.

The action of driers on the drying oils has been made the object of numerous research studies but it does not seem that it has been previously attempted to utilize the properties thus clarified to identify the driers existing in a paint. The authors of the present work have endeavored to close this gap in our knowledge. The driers utilized were the naphthenates of cobalt, manganese and of lead.

The oils tested comprised dehydrated castor oil and polymerized Chinese wood oil. The effects produced on a given drying oil are different according to the drier utilized, but independent of the fatty acid entering into the composition of the drier.

Drying of Printing Ink Colors

by R. Walter; Deutsche Farben Zeitschrift, vol. 9, No. 10, pp. 387-395.

The author studied successively the drying of printing ink colors by oxidation, by thermal polymerisation, by absorption of the filming agent, by evaporation of solvents and by vaporisation.

As a result of the development of new branches of the printing industry, of the employment of new types of printing machines, of new types of paper and particularly as a result of the development of the synthetic resins as a medium for printing inks, the technical field in this direction continually widens. New problems will be posed in the future to the technologist so that the author considers, after a thorough survey of the actual state of present day techniques in printing ink formulations and applications, particularly from the drying aspect after application, that in a very few years, an entirely new handling technique will have emerged.

Structural Properties of Emulsion Paints Based on Synthetic Resins

by A. T. S. Rudram; Paint Technology, vol. 19, No. 215, pp. 265-266, (G. Britain).

The results of detailed studies conducted at the British Paint Research Station, Teddington, on emulsion paints based on the synthetic resins are given:

1. Examination of various latex and the effect of plasticizers, thickeners, pigments, etc. on the formation and the structure of the film;

The measurements of the viscosity were conducted with the Ferranti viscometer;

2. A study of emulsion polymerization and of the factors effecting the properties of the emulsion including the dimensions of the pigment particles;

3. Development of analysis techniques and a test to examine the behavior of the paints when they are applied on various sub-surfaces.

The examination of the paints was conducted with the aid of the electronic microscope.

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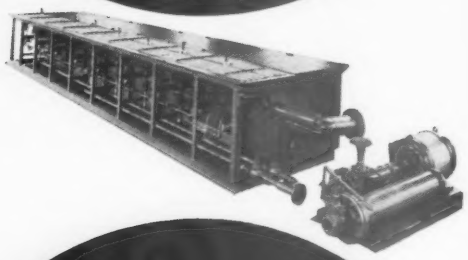

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ACS PROGRAM

(*From page 67*)

2:55 R. D. Bitting, B. G. Brand and E. E. McSweeney. *The Effect of Tall Oil Rosin on the Yellowing of Interior Enamels.*

3:15 Charles W. Hock and Albert N. Abbott. *The Topography of Pressure-Sensitive Adhesive Films*

3:30 F. H. Wetzel. *Function of Rosin and Rosin Derivatives in Pressure-Sensitive Adhesives.*

3:50 W. Szukiewicz, J. W. Hull, G. C. Toone and M. E. Bailey. *Diisocyanates-Castor Oil-Resin Coatings.*

4:05 Gordon S. Fisher, Robert L. Kenny, Nealy C. McConnell and N. Mason Joye. *The Hydrocarbon Composition of Gum Turpentine.*

4:20 Gerald A. Thomas, Charles E. Reid and J. Erskine Hawkins. *Physical and Thermodynamic Properties of Terpenes. The Dipole Moments of Ten Terpene Hydrocarbons.*

WEDNESDAY, APRIL 10

Naval Stores Symposium

9:00 A.M. V. P. Wystrach, L. H. Barnum and M. Garber. *Liquid Phase Catalytic Isomerization of a-Pinene.*

9:15 J. Erskine Hawkins and Robert E. Fuguitt. *The Rate of Dimerization of Allo-Ocimene.*

9:35 B. A. Parkin and G. W. Hedrick. *New Amino Acids From Turpentine.*

9:50 Richard K. Madison and Gloria K. Bellis. *Some Rearrangement and Decomposition Products of Pinane Hydroperoxide.*

10:05 Paul O. Powers. *Terpene Polymers.*

10:30 Paul O. Powers. *Terpene Adducts and Terpene Phenolics.*

10:50 C. S. Nevin and C. R. Young. *Improved Tall Oil Fatty Acids.*

11:10 E. E. McSweeney, R. K. Brandt and E. R. Mueller. *Some Observations on the Maleic Modification of Acid Refined Tall Oil Varnishes.*

11:30 R. E. Dunbar and M. F. Dante. *Improved Rosin Esters Through the Use of Epon Resins.*

Symposium on Literature of Naval Stores

2:00 P.M.

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THURSDAY, APRIL 11

New Developments in Alkyds and Other Polyester Resins

9:00 A.M. J. Kenneth Craver, division chairman. *Introductory Remarks.*

9:05 Ellington M. Beavers, symposium chairman. *Comments.*

9:10 E. Scott Pattison. *General Remarks on the Alkyd Field.*

9:25 George Somerville. *A Comparison of Glycerol and Pentaerythritol Alkyds in Water and Detergent Resistance.*

9:40 H. L. Wampner. *Isophthalic Alkyds.*

10:10 Thomas R. Steadman and John O. H. Peterson. *Dibasic Acids I. Routes to A Mixture of Undecanedioic and Dodecanedioic Acids.*

10:40 William M. Kraft. *The Molecular Approach to Alkyd Structure.*

2:00 P.M. E. W. Wilson and W. M. Gearhart. *Preparation and Physical Properties of Some NeopentylGlycol Saturated Polyesters.*

2:30 Dudley T. Moore, R. H. Boehringer and M. H. Smith. *Polymerized Fatty Acid Polyesters.*

3:00 Arthur L. Smith and J. R. Lowry. *Unsaturated Polyester Resins Comprising Methyl Methacrylate Monomer.*

3:30 T. E. Bockstahler, O. C. Kohler, F. H. Zimmerli and A. P. Kotloby. *An Improved Stability Test for Uncatalyzed, Thermosetting Resins.*

4:00 Frank B. Root and R. W. Amidon. *Tung Oil and Tung Oil Derivatives in Polyesters.*

•

Materials Handling Show To Stress Systems

The 7th National Materials Handling Exposition is expected to be 15 percent greater in size, according to Clapp & Poliak, Inc., exposition management. It will be held at Philadelphia's Convention Hall, April 29-May 3.

Approximately 250 companies are expected to use more than 100,000 square feet of space in the show, which will emphasize systems of material handling. More than 100 types of equipment will be demonstrated.

Theme for the 1957 show will be "Materials Handling, Key to Automation."

Thirty-two speakers will address a conference conducted by the American Material Handling Society, which will also stress systems. Such topics as the effect of handling systems on building designs and layouts, the new look in shipping, and new perspectives in manufacturing under automatic handling will be discussed.

The Handling Society's annual banquet will be held on May 1 at the Bellevue-Stratford Hotel.

•

Announce Research Merger

The formation of a research partnership between Ionics, Inc., of Cambridge, Mass., and Diamond Alkali Co., Cleveland, has been announced by Raymond F. Evans, chairman and chief executive officer of Diamond, and Dr. E. R. Gilliland, president of Ionics.

Mr. Evans explained that under the new arrangement Ionics will devote all of its uncommitted research efforts to Diamond's interests. Ionics, however, will continue to pursue its interests in water conditioning, ion exchange treatment of sugar solutions, and other already established fields, Dr. Gilliland said.

Research under the new partnership will be carried on at the Cambridge facilities of Ionic, in cooperation with Diamond's Research and Development staff at Painesville, Ohio.

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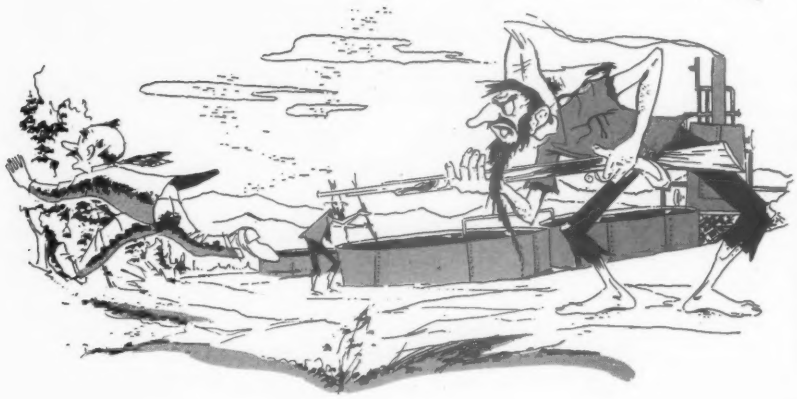

Perhaps this is over-simplification—but there is no doubt—it is easier and more economical to manufacture Butadiene-Styrene or Acrylic paints when UNAPEX is used as the emulsion vehicle.

UNAPEX eliminates the purchase, storage, and costly production time needed to incorporate a dozen new items into your formulation.

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NAFTONE

high initial viscosity. The extreme rapidity of the initial reaction developed with resilient foams is a direct indication of the complete intermix now obtained with the P-JGC-504 gun. The use of the DeVilbiss material heater is very essential in the application of all three types. It allows the users of isocyanates prepolymers to reduce its initial viscosity down to a sprayable consistency.

Research to provide more sprayable combinations is now in process and each day brings about a better understanding of the potential of the spray method as the major method of application. The spray method makes possible the reduction in time of insulating tanks from 8 hours to 40 minutes. The use of sprayed coatings on the back of rugs and carpet as an anchor for the chair stitch as well as its anti-slip properties opens a tremendous field. Its use in air conditioning, on valves, on pipes, housing, refrigerators, vats, corrugated panels, radio and TV equipment, railroad, general transportation, automotive and aircraft industry, are but a few of its intended adaptations.

Now that the JGC gun and auxiliary equipment have been perfected, and the vexatious obstacle of short pot life has been eliminated, major suppliers of the above types of finishes are re-checking previous formulations in order to obtain those results which formerly were not obtainable.

Care and Maintenance

Care and maintenance of the equipment is very simple. However, it is necessary that the gun, flow meter, hose and tanks or containers be washed and dried at the end of operations each day, so as to prevent known reactions that are characteristics of certain materials, having a detrimental effect: This is no more than is required to keep all spray equipment in first class working order. No new technique is required as a matter of fact, for the use of our HD-501 hose cleaner will save time and material, and also facilitate a more thorough overall cleaning and drying operation.

Summary

To summarize our work on this problem—prior field research enabled DeVilbiss to analyze the overall requirements for the application of catalyst type coatings. In so doing, we were able to develop and properly field test a new type of equipment, and its use to date has indicated wide acceptance in the resin field as discussed above.

It is believed that the catalyst research and development provides industry with the required mechanical means of application which has been the major bottle neck, to date.

In the future, DeVilbiss stands ready to cooperate with you in the application of any new product or new process that industry may develop. The equipment just discussed furnishes a practical and sound solution to a difficult set of production problems which involve the application of catalyst types of finishes now appearing on the market.

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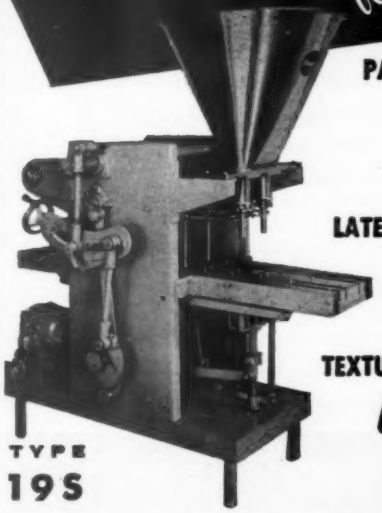

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CALENDAR OF EVENTS

April 7-12—ACS Spring Meeting, Div. of Paint, Plastics and Printing Ink Chemistry, McAllister Hotel, Miami, Fla.

April 10-13. Twenty-first annual convention of the Southern Paint and Varnish Production Club, Soreno Hotel, St. Petersburg, Fla.

April 26-27. Southwest Paint Convention and Raw Material Exhibit, Shamrock Hotel, Houston.

April 29-May 4. American Oil Chemists Society, Roosevelt Hotel, New Orleans, La.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmilers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Haynes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.

Detroit, 4th Tuesday, Rachham Building.

Golden Gate, 3rd Monday, E. Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Bill Williams Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Wesnesday.

St. Louis, 3rd Tuesday, Kings-Way Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday 40-8 Club, Buffalo.

NEWS

Navy About to Close Paint Making Facilities

The Navy is about to discontinue operation of its two large paint plants, it has been reported.

Defense Department sources have disclosed that a shutdown order has been drafted and awaits the signature of Assistant Secretary of Defense Perkins McGuire.

It is believed that Mr. McGuire will sign the shutdown order as soon as he becomes acquainted with the situation. He has recently replaced Thomas Pike, who resigned the Defense post.

The Defense Department reportedly now has all the cost data it needs to justify the closing of the plants at Norfolk, Va., and Mare Island, Calif., on the grounds that supplies can be obtained more cheaply from private industry.

Paint production at the two plants has been cut back in recent years, under the new government policy of discontinuing operations that compete with private industry. The plants once produced all of the paint required by the Navy.

They now produce only some of the ship-bottom and anti-fouling paints.

Surveys by the National Paint, Varnish and Lacquer Assoc. disproved Navy contentions that the plants could produce paints more cheaply than private industry. The Navy had also said that private sources could not produce sufficient quantities to meet Navy needs.

The surveys were reported to the Defense Department and to Congress.

The general policy of the government with regard to activities that may be in competition with private enterprise is that it will not start or carry on any activity to produce a service or product for its own use if it can be procured from private enterprise through ordinary business channels.

The government now has 19,321 installations performing commercial and industrial functions, according to an inventory by the Bureau of the Budget issued last May.

New Wrinkle Transfers

Vehicle manufacturing operations of New Wrinkle, Inc., of Dayton, Ohio, have been transferred to Alkydol Laboratories, Inc., in Cicero, Ill., it has been announced.

The change in operations frees New Wrinkle to expand its licensing program to the paint industry.

Both oleoresinous and alkyd wrinkle vehicles which have been manufactured by New Wrinkle and its associate company, Midland Chemical Corp., will be produced by Alkydol.

The firm announced that John Thomas has been transferred to Alkydol Laboratories, to assist in manufacturing, quality control and customer service.

•

Frank W. Judson Passes

Frank W. Judson, 83, retired vice president of Pittsburgh Plate Glass Co., died on February 8, at Pittsburgh.

Mr. Judson had spent 60 years with the company, starting as a salesman in the Merchandising Division in Minneapolis, and being elected vice president in 1935.

He is survived by two granddaughters and three great grandchildren.

A highly refined version of the well-known R-B-H Resin 510 is now available in a form virtually taste-and odor-free, designated as Resin 529. Manufactured in pulverized form for easier processing, it retains the features of Resin 510:

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Progressive New Zealand Manufacturer wishes to contact a reputable American Paint Company with a view to manufacturing under license automotive and industrial finishes and lacquers. Highest references available. Reply: Manufacturer, R. Hill & Son, Ltd., 236 Queen St., Auckland C1, New Zealand.

TECHNICAL Bulletins

PALLET STANDARDS

Reduction of pallet sizes to 10 standard sizes is suggested in a tentative draft for "Proposed American Standard Pallet Sizes" available from the Society of Industrial Packaging and Materials Handling Engineers, Dept. PVP, 111 W. Jackson Blvd., Chicago 4, Ill.

The pamphlet stresses greater utilization of trailer truck and rail car area and cube. It lists 10 recommended sizes, seven rectangular and three square.

Theories and factors which were considered in determining the series of sizes are included, as are sizes and area ratios for the series in boxcars and trucks.

PROCESS INSTRUMENTATION

A line of process equipment including flow, pressure, density and chlorination instruments has been cataloged by Fischer & Porter Co., Dept. PVP, Hatboro, Pa.

The 31-page publication, Catalog 2, is heavily illustrated and contains diagrams and tables on the various products, listing prices, specifications and other pertinent data.

VISCOMETERS

The Norcross Corp. has issued three bulletins describing and illustrating viscosity controlling and recording instruments.

Bulletin No. V-1211 describes the automatic viscosity controller model M8C. The single-sheet bulletin diagrams the instrument and lists the principles of operation.

Bulletin No. V-1216 covers electric-pneumatic viscometer measuring elements for use with Norcross recorders or controllers. It lists principles of operation and general information on two atmospheric pressure models and two pressure and vacuum models.

Bulletin No. V-1217 deals with viscometer recorders in the Model R3 series. All bulletins issued by Norcross Corp., Dept. PVP, 247 Newtonville Ave., Newton 58, Mass.

DEVELOPMENT IDEAS

The first issue of a new quarterly publication, "Ideas in Development," is being sent to industrial research executives and other researchers by the Chemical Division of Armour and Company.

The booklet will cover the latest developments of the Armour Chemical Division, according to Karl M. Bierman, manager of the market development department.

The first issue includes articles on oleyl amines, alpha-sulfoalkyl acids and ethochemicals.

LATEX BINDER

A new product information bulletin describes the latex binder, Lytron 680, produced by the Plastics Division of the Monsanto Chemical Company, Dept. PVP, Springfield 2, Mass.

The bulletin presents a general description of Lytron 680 and lists the chemical and physical properties. The components of latex paints are discussed, as are the principles of formulation and manufacturing methods.

A considerable portion of the publication presents suggested formulas for both interior and exterior paints and charts the raw materials to be used.

COMBUSTION SAFEGUARDS

Now available is the latest revision of Bulletin SC-1006, "Selas Combustion Safeguards," issued by Selas Corporation of America, Dept. PVP, Dresher, Pa.

The 12-page publication describes the operation and construction of Selas Automatic Fire Checks, and Selas Safety Blowouts, which are used similarly to fuses and circuit breakers in electrical supply lines.

The booklet makes extensive use of charts, diagrams and illustrations on both products.

PROCESS EQUIPMENT

A new 32-page general stock catalog has been published by Fischer & Porter Co., Dept. PVP, 907 Jacksonville Road, Hatboro, Pa., manufacturer of complete process instrumentation.

The catalog includes prices, and covers indicating, recording, controlling, and transmitting instruments for flow, pressure and density.

FIRE SAFETY

An 8-page safety code titled "Inspecting, Recharging and Maintaining Fixed High Pressure Carbon Dioxide Extinguishing Systems" has been published by the Fire Equipment Manufacturers' Assoc., Dept. PVP, Suite 759, One Gateway Center, Pittsburgh 22, Pa.

The code covers hydrostatic pressure testing methods, criteria for determining cylinder usability and safety precautions to observe when recharging cylinders.

Fifteen inspection checkpoints covering the inspection of hoses, valves, nozzles and cylinders are also listed and discussed.

The code on high pressure carbon dioxide systems is the second in a series published by FEMA. A similar code on portable extinguishers is also available. Single copies are free, quantity prices on request.

INDUSTRIAL MIXERS

Gabb Special Products, Inc., Dept. PVP, Windsor Locks, Conn., has published a brochure on its line of Shear-Flow industrial mixers.

The brochure illustrates the size range, applications, specifications and exclusive features of the mixers.

TEMPERATURE CONVERSION

A temperature conversion chart is being offered by the Moeller Instrument Co., Dept. PVP, Richmond Hill 18, N. Y.

The pocket size aid contains tables of Fahrenheit and Centigrade temperature equivalents.

RADIATION GAGE

Data sheet 10.9-3 describes the Curtiss-Wright Radiation Gage used with a Brown ElectroniK Strip Chart Recorder. The instrument makes continuous noncontact measurement of weight per unit area of sheet materials.

The single-sheet, illustrated publication contains information on the principle of operation, technical data and construction of the instrument.

It may be requested by number from Industrial Division, Minneapolis-Honeywell Regulator Co., Dept. PVP, Wayne and Windrim Aves., Philadelphia 44, Pa.

HYGIENIC GUIDES

Five additions have been made to the American Industrial Hygiene Association's series of Hygienic Guides.

The additions are on carbon disulfide, ethylene dichloride, hydrazine, methylene dichloride and nickel carbonyl. Each Guide covers potential hazards, maximum allowable concentrations to which employees may be safely exposed, and engineering and medical methods of control.

Major uses in industry and references to technical literature on each material are also given. Available from American Industrial Hygiene Assoc., Dept. PVP, 14125 Prevost, Detroit 27, Mich., at 25 cents each.

Each Guide is a single sheet. A discount of 20 percent is allowed on orders for five or more, 40 percent for 100 or more.

ION EXCHANGE RESINS

Price List "M" contains price information on analytical-grade anion exchange resins, cation exchange resins and monobed resins, and other data of potential value to the laboratory worker.

A section on considerations in the selection of a specific ion-ex-

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change resin discusses the effect of anion exchanger functional group cross linkage and particle size. The information is related to a tabulation of properties of four groups of resins.

Data on effective pore size, swelling volume and exchange capacity is included with the materials listed. A list of specific types of resins which can be produced, and a bibliography of books and reviews pertaining to ion exchange are also included.

Available from BIO-RAD Laboratories, Dept. PVP, 800 Delaware St., Berkeley, Calif.

INDUSTRIAL EQUIPMENT

A 24-page illustrated handbook catalogs office and factory equipment by the General Industrial Co., Dept. PVP, 5736X Elston Ave., Chicago 30, Ill.

The pamphlet contains detailed specifications on a full line of industrial equipment. Descriptive data is furnished on such items as shelf trucks, lockers, small parts cabinets, hand dryers, fireproof blueprint cabinets and glass door display cases.

ZINC REVIEW

The American Zinc Institute, Inc., has published "A Review of the Zinc Industry in the United States in 1956."

The 15-page booklet summarizes the production and consumption picture of the industry for the past year. Tables cover mine production, imports of slab and ore, zinc uses by grades and other topics.

The growth of zinc used for galvanizing and die casting is discussed, with emphasis on the mounting consumption in continuous galvanizing and the use of zinc die castings by the automotive industry.

Present trends in plant expansion are noted, and producers' flexibility of operations commented upon. The American Zinc Institute, Inc., Dept. PVP, 60 East 42nd St., New York 17, N. Y.

LUBRICANTS

Another revision of "Lubricants for Rockwell-Nordstrom Valves" is available from Meter and Valve Division, Rockwell Manufacturing Co., Dept. PVP, 400 N. Lexington Ave., Pittsburgh 8, Pa.

The bulletin lists four new lubricants along with selection data and characteristics of other lubricants.

Instructions for lubricating and servicing Rockwell-Nordstrom valves is given, and descriptions and illustrations of lubrication equipment are included.

TERPENE OXIDES

The structure, properties, reactions and suggested uses of two epoxy compounds, dipentene monoxide and alpha-pinene oxide, are described in two bulletins, 81 and 82, published by Becco Chemical Division, Food Machinery and Chemical Corp., Dept. PVP, Buffalo, N. Y.

Both of the compounds are suggested for use as intermediates in organic synthesis as solvents, as plasticizers for resins such as polyvinyl chloride, and in the manufacture of protective coatings.

FORK TRUCK

A four-page folder illustrating and describing the "Safe Hite" electric powered fork truck with 2,000 pound capacity has been published by the Elwell-Parker Electric Co., Dept. PVP, 4205 St. Clair Ave., Cleveland 3, Ohio.

The folder contains photos of typical truck applications and major component parts, and engineering drawings. Detailed specifications are also included, along with operating and application information.

ELECTRON MICROSCOPES

A 12-page brochure containing data on the construction and operation of Norelco Electron Microscopes is available from the Instruments Division, North American Philips Co., Inc., Dept. PVP, 750 S. Fulton Ave., Mount Vernon, N. Y.

The illustrated booklet covers the electron optical system, pumping unit, electronics, high voltage, magnetic beam and other characteristics of the microscopes.

Specifications for two models, EM-100B and EM-75 are listed.

ANTIFOAM

An information sheet describing the properties and applications for Hodag Antifoam P-3 is available from Hodag Chemical Corp., Dept. PVP, 7247 North Central Park, Chicago 45, Ill.

The sheet also includes services available and contains shipping data.

SILICONES

An illustrated, eight-page catalog discussing more than 115 applications for silicones is available from the Silicone Products Department, General Electric Co., Dept. PVP, Waterford, N.Y.

Designated CDS-97, the publication lists specialized literature covering product and application information.

NEWS

Greens Gain Popularity In Colortrend Report

Turquoise and aqua moved into first place in the color tastes of the nation in the last six months of 1956, according to the Spring 1957 Colortrend Report of the California Ink Co.

Yellows, which held first place during the first half of the year, dropped to third, and almost all colors containing yellow took a similar drop, the report said.

Greens, especially those on the blue side, moved up after a weak showing in the early part of 1956. Beige, gray browns and off-whites moved up strongly, the report showed. Increased interest was also evident in lighter pastels, including the muted neutrals called "Nomad" colors.

The Colortrend Report is based on refill orders for tubed colorants from paint retailers. Initial stock orders to manufacturers are eliminated from the study.

The statistics are not weighted in favor of any single type of paint.

•

Resin License to Alkydol

Alkydol Laboratories, Inc., of Cicero, Ill., has been awarded a license to produce epoxide resins cured by alcoholates of polyvalent metals by Chemische Werke Albert of Germany, holder of a U. S. patent.

Resins produced under the patent are recommended for protective coatings, adhesives, castings and laminates. Outstanding properties are fast-heat curing, stability, color retention and chemical and solvent resistance.

•

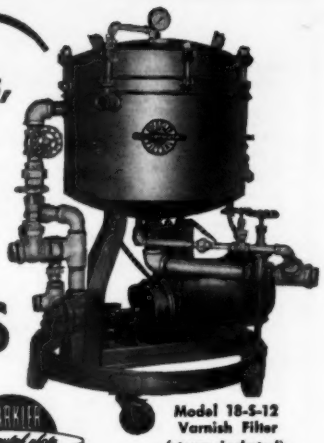
ADM in Belgian Venture

Archer-Daniels-Midland Co. has joined with Petrofina, one of Europe's largest petroleum processors, to manufacture fatty acids and their derivatives in a new plant in Brussels, Belgium.

The new organization has been named Oleochim, S. A., and will be operated by Palmafina, a subsidiary of Petrofina.

Remove "Fish Eyes", Skins, Incidental Solids and Semi-Solids from Varnish and Lacquer with . . . .

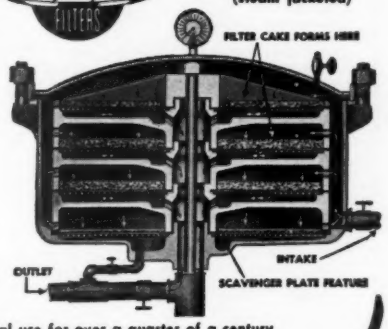
SPARKLER FILTERS



Model 18-S-12 Varnish Filter (steam jacketed)

Many varnish makers now use Sparkler Filters to clarify varnish, lacquers, and other clear liquids. The brilliance and polish obtained by filtering with Sparkler Filters is far superior to results obtained with other methods of clarifying paint products.

Our engineers are ready to give personal attention to your problems.



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MICA WATERGROUND AND MICRO
An Excellent Extender For All Types of Interior and Exterior Emulsion Paints
Makes a well-knit durable film
The English Mica Co.
STERLING BUILDING STAMFORD CONN

DeVilbiss In New Branch

The DeVilbiss Co. has announced the completion of new West Coast headquarters at East Slausen and South Garfield Avenues near the Santa Ana Freeway in Los Angeles.

The new structure is now in use as sales and service center, rebuilt exchange and warehouse unit. Also included is a customer research laboratory for demonstration and testing of spray applications.

Para-cresol Expansion

The first unit of a para-cresol expansion program is now in operation for the Hercules Powder Co. at its Gibbstown, N. J., plant, according to the company.

The unit is capable of producing several million pounds of para-cresol annually, the company said. Facilities for conversion of the para-cresol to di-tert-butyl-para-cresol are also in operation.

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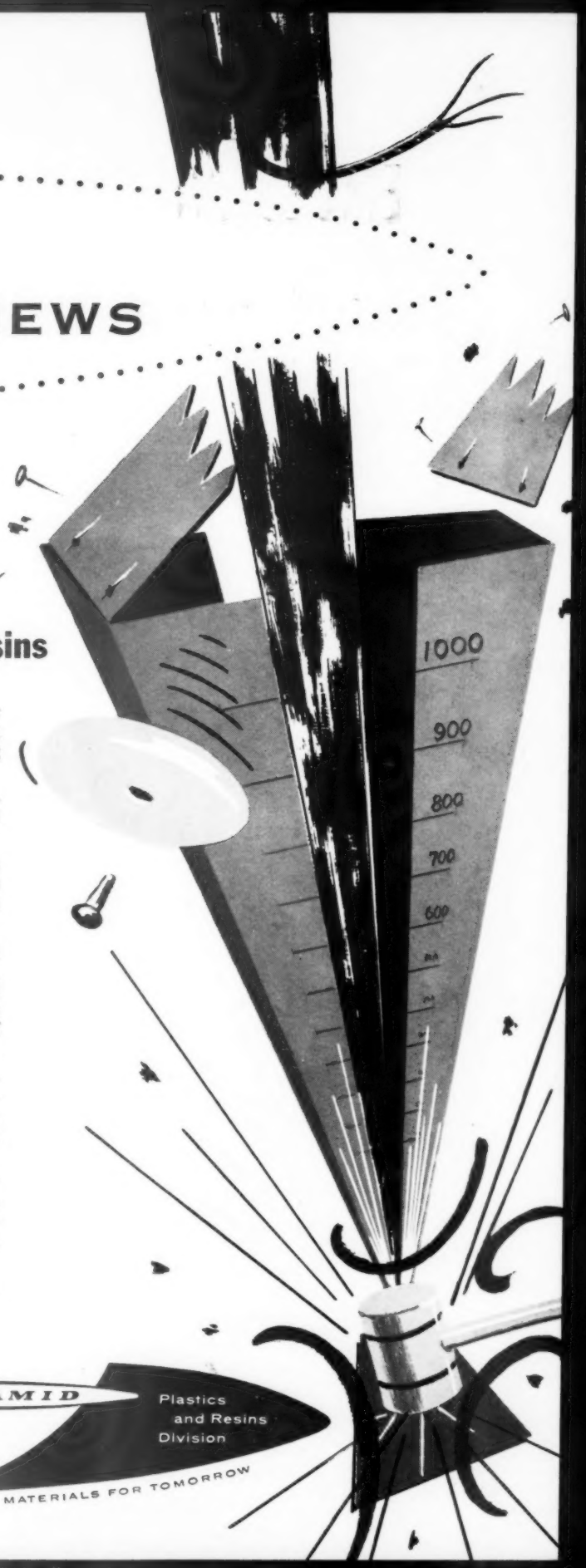
CYANAMID

PRODUCT NEWS

Hardness and impact resistance hit new highs

in CYZAC* Coating Resins



Never before have such exceptional hardness and mar resistance been combined with such flexibility and impact resistance as in Cyanamid's two new CYZAC Coating Resins.

CYZAC Resins also impart outstanding chemical resistance, high gloss and gloss retention, fast cure, good enamel stability and exterior durability.

These distinctive properties of enamels formulated with CYZAC Resins make them especially suited to formulation of interior or exterior baking enamels for decorative and industrial use.

CYZAC 1006, used alone, gives palest initial color and best color retention at elevated temperatures. Generally, use with a primer is recommended. It may be blended with suitable REZYL® Resins for a favorable combination of adhesion and color properties. The relative low price of the CYZAC component makes the blend quite economical.

CYZAC 1007 produces baked finishes with excellent adhesion and may be applied over unprimed steel. Compatible with REZYL Resins, it also produces economical, fast-baking films which cure to exceptional hardness, impact resistance and flexibility.

Mutually miscible in all proportions, CYZAC Resins may be blended to combine desirable properties. Complete cure takes 15 minutes or less at 300°F. Enamel stability is outstanding, initial gloss is high, and gloss retention excellent.

For details, send for technical data sheets and samples, which are available on request.

50 YEARS 1907 1957

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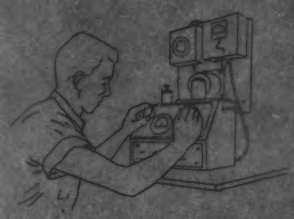
Accumulated data of great value are available to acquaint the industry with the latest technology, thus saving the paint manufacturer countless hours of investigation.

Avoid wasteful duplication of original research. Consult GK Technical Service today.



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